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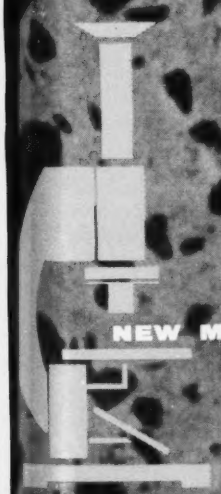
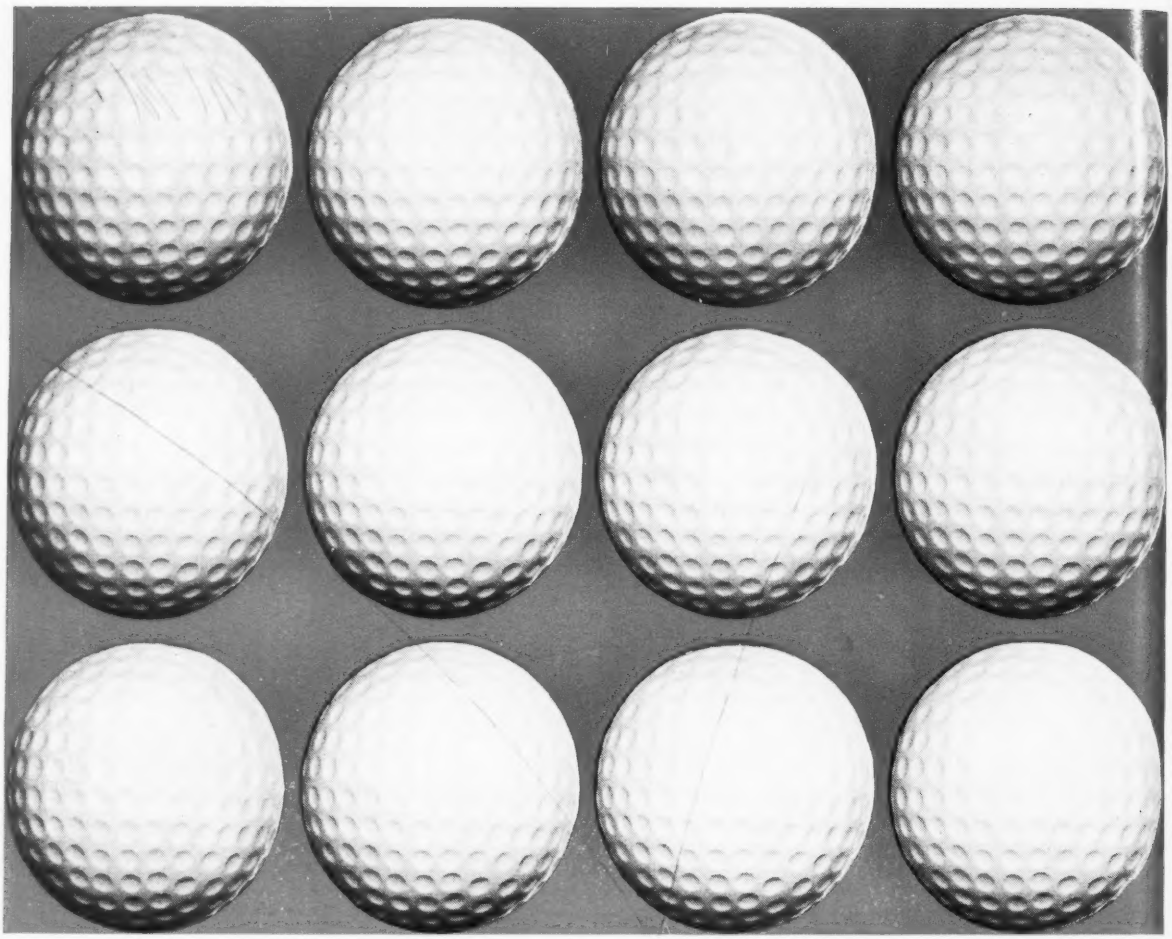
RUBBER WORLD



NEW METHODS FOR DISPERSION EVALUATION



Du Pont means *UNIFORMITY* in Rubber Chemicals

Du Pont rubber chemicals are made to exacting standards of quality and reliability to meet rigid inspection controls.

That's why you, like so many leading manufacturers, can depend on Du Pont rubber chemicals to meet your most rigorous requirements.

This is part of Du Pont's continuing effort to provide you with dependable rubber chemicals of the highest quality and uniformity.

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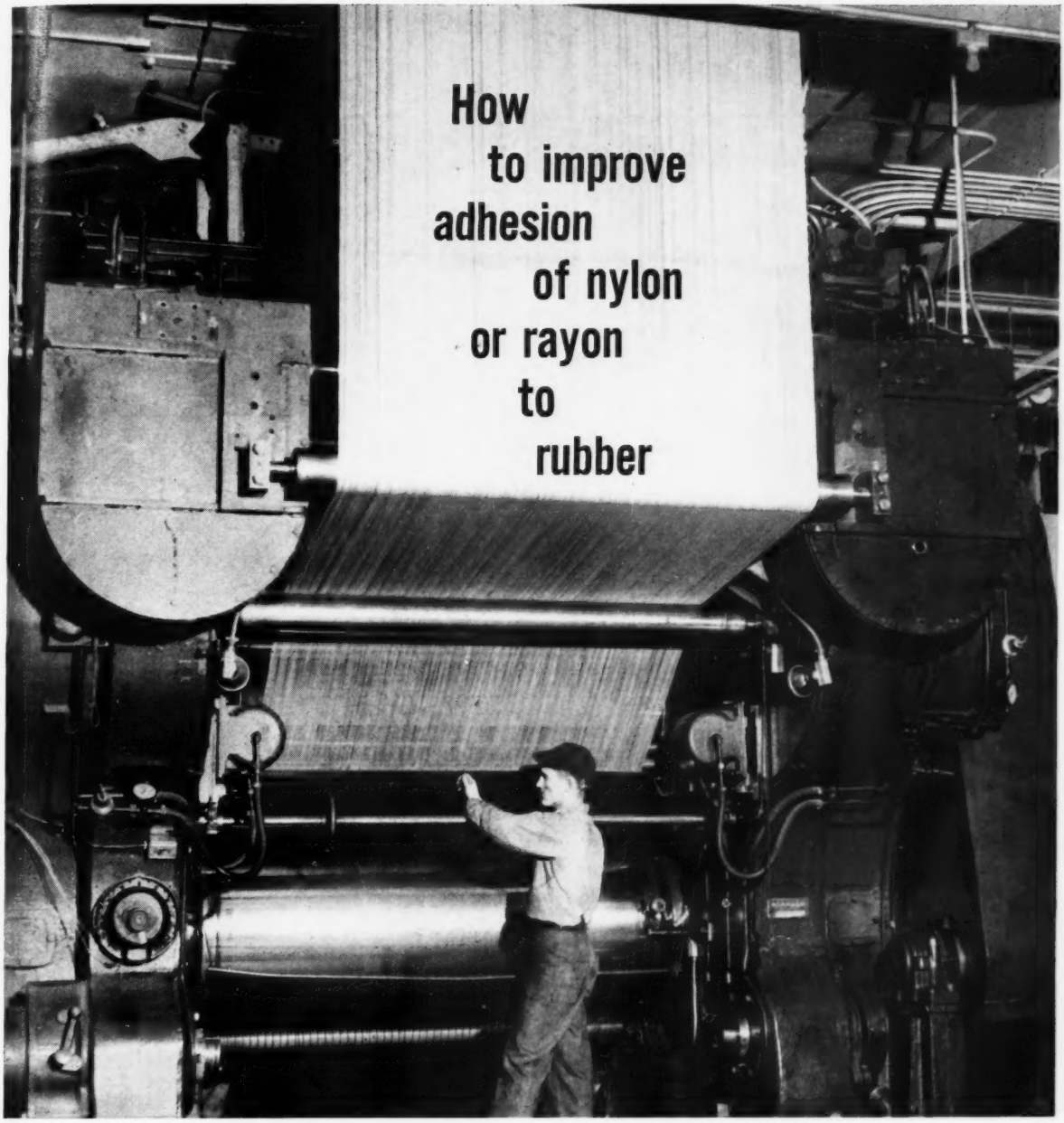
Better Things for Better Living . . . *through Chemistry*

RUBBER WORLD, November, 1961, Vol. 145, No. 2. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 3rd & Hunting Park Ave., Philadelphia 40, Pa., with Editorial and Executive Offices at 630 Third Avenue, New York 17, N. Y., U.S.A. Second Class Postage paid at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States $5.00 per year; Canada $6.00; all other countries $10.00. Single Copies 50¢ in U.S.; $1.00 elsewhere. Address Mail to N. Y. Office. Copyright November, 1961, by BILL BROTHERS PUBLISHING CORP.



USE HYCAR 2518. This new vinyl pyridine latex resulted from years of study of problems relating to achieving better performance of fiber-reinforced rubber products. Using Hycar 2518 as pretreatment of man-made yarns, cord and fabric gives positive control, exceptionally high adhesion, easily processed formulations and good "green tack."

Recipes vary according to the fiber involved, the type of rubber stock, and processing limitations and application requirements. Superior adhesion results in all cases. Hand or stiffness of treated fabric or cord can be varied to meet specific needs.

To get more information about this or other ways you can produce better textiles, often at lower costs, write today for information to Department MD-9, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. In Canada: Kitchener Ontario.

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RUBBER WORLD

VOLUME 145 NUMBER 2 NOVEMBER, 1961

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This month's cover, which bears some resemblance to a lunar landscape, is actually a light photomicrograph of a silicone rubber sample, magnified 150 times. The dark "craters" are undispersed particles of zinc oxide.

Cover design by Robert McElrath

SERVING THE RUBBER INDUSTRY SINCE 1889

A BILL BROTHERS PUBLICATION

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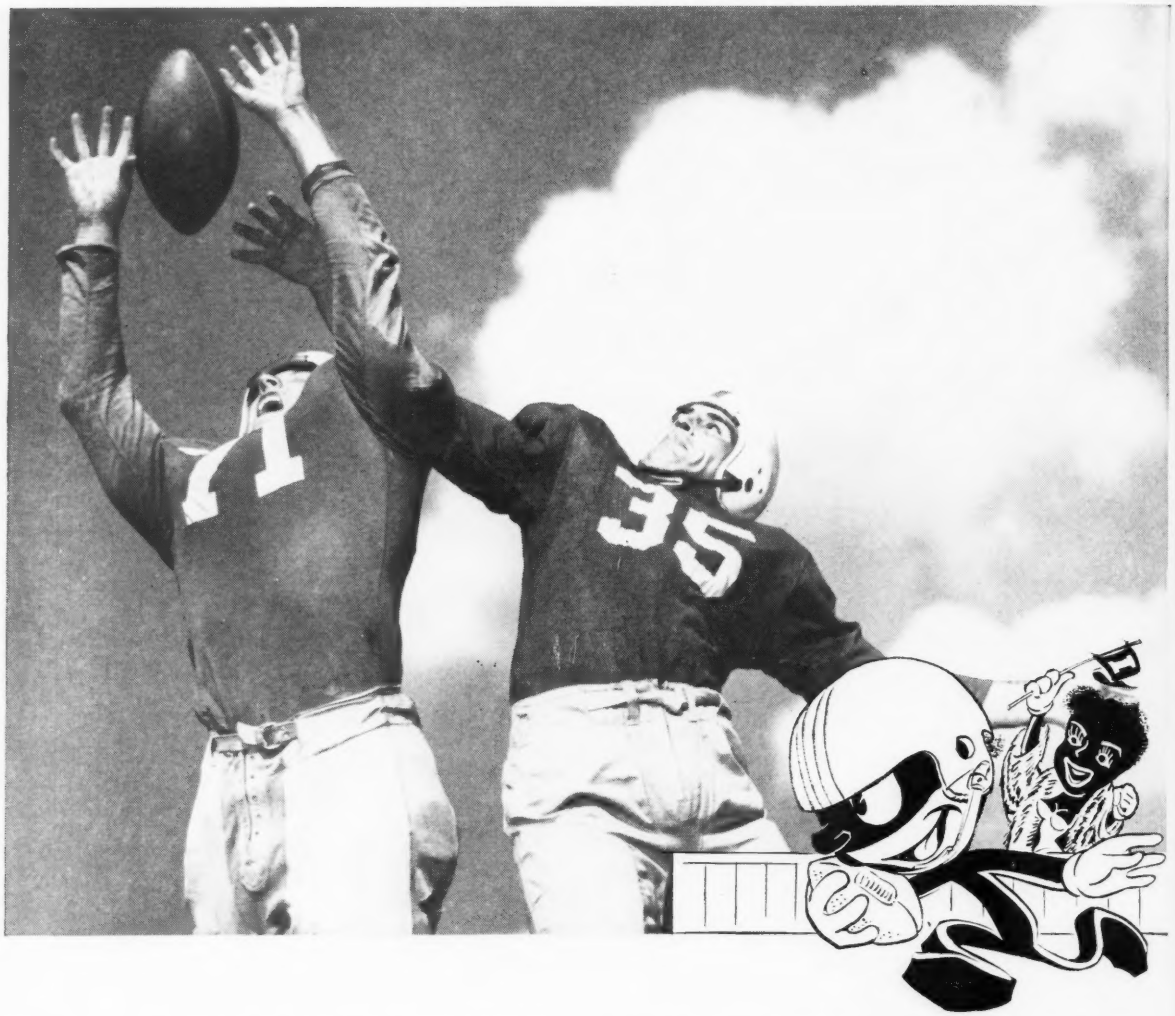
BPA NBP BPA

I is for Imparting good defensive qualities at moderate cost



Philblack* I puts up a strong defense against abrasion. Blocks the growth of cuts and cracks. Tires made with Philblack I score substantial gains in tread miles. And Philblack helps disperse heat, too. Increases flex life. Enables you to turn out sturdy tires in the moderate price range . . . and sell them at a *profit*.

If you have a problem concerning rubber, your Phillips technical representative will tackle it (and help you throw it for a loss.) Take full advantage of Phillips valuable technical assistance and experience in the rubber field.

*A trademark

LET ALL THE PHILBLACKS WORK FOR YOU!

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O **Philblack O, High Abrasion Furnace Black.** For long, durable life. Good conductivity. Excellent flex life and hot tensile. Easy processing.

I **Philblack I, Intermediate Super Abrasion Furnace Black.** Superior abrasion. More tread miles at moderate cost.

E **Philblack E, Super Abrasion Furnace Black.** Toughest black yet! Extreme resistance to abrasion.

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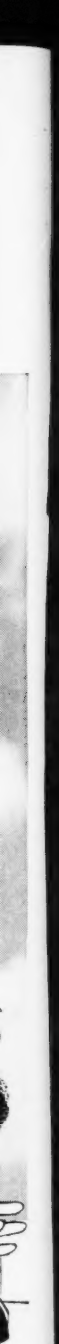

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news of the rubber world

November, 1961

With Goodyear Tire & Rubber Co. scheduled to put its plant for production of Budene and Natsyn (cis-polybutadiene and cis-polyisoprene) on stream in mid-November, three sources of polybutadiene are now available to the rubber fabricator. The special requirements of compounding cis-polybutadiene for tire treads and carcasses are discussed on page 69.

Giulio Natta, of Milan, Italy, pioneer in development of stereo polymers, has been awarded the first International Synthetic Rubber Gold Medal for his work. Page 102.

British rubber firms have just gone through 21 years without an official labor dispute of any kind, a result achieved through consultation and negotiation between representatives of management and workers joined in the National Joint Industrial Council for the Rubber Manufacturing Industry. Page 103.

Use of electron microscopy, radiography, and micro-tension testing techniques to supplement light microscopy in evaluation of pigment dispersion is discussed by a member of the Columbian Carbon Co. research staff. Page 78.

Conventional clickers are being challenged by a new electronically controlled die cutting machine which is claimed to produce parts faster and at lower cost than the clicker. Advantages offered are cleaner cutting and ability to use dies differing in height on successive runs without adjusting beam height. Page 84.

Another new technical development is the vertical continuous vulcanization tower installed by Kaiser Aluminum & Chemical Corp. at its Bristol, R. I., plant. The tower can manufacture cable in lengths up to 5,000 feet. Page 76.

this machine uses 66 rubber belts

There are 66 rubber belts in each Pitney-Bowes National Sorter-Reader which feeds, sorts, conveys and stacks 750 paper items per minute (checks, deposit slips or whatever). Not visible, but equally vital, are the rubber air conduits, power and timing belts which also help the Sorter-Reader to do its job.

About 200 such machines are now installed in banks across the United States and extensive use may be made of it in the future in department stores, insurance companies and others dealing with a great volume of paper forms.

Without the rubber industry, this and most other machines wouldn't exist.

Rubber is a vital and basic part of modern technology. In much the same way, RUBBER WORLD is a basic part of the rubber industry. For more than 72 years RUBBER WORLD has supplied its industry with the most complete and up-to-the-minute information available.

This was never more true than today, when RUBBER WORLD leads its field in editorial innovation and in circulation vitality.

By any comparison, RUBBER WORLD is the dominant book.

- 23% more circulation among rubber products manufacturers than the next magazine in the field.
- 66% more circulation among natural and synthetic manufacturers and fabric, machinery and equipment manufacturers.

RUBBER WORLD

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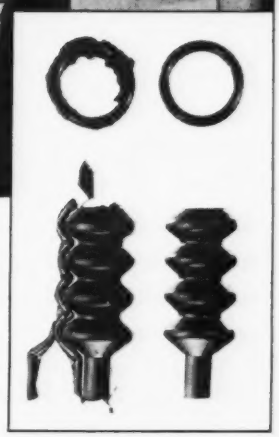
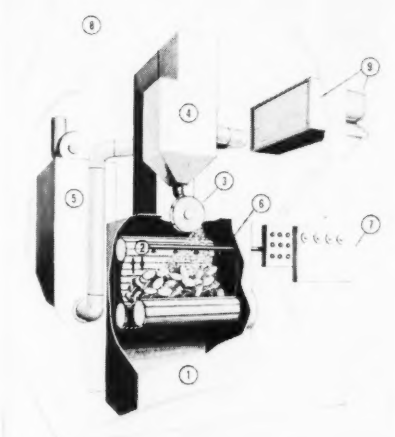
Up to 10,000 precision molded rubber parts now deflashed in 3 to 5 minutes by Wheelabrator mechanical method



Precision molded parts are deflashed in 3 to 5 minutes in the new Wheelabrator Mechanical Deflasher. Field performance has proven that tremendous reductions can be made in deflashing costs. For instance, one firm is now deflashing a quantity of shaft seals in 4 minutes that formerly required 3½ hours of hand labor.



WHEELABRATOR RUBBER DEFLASHER

(1) Deflashing Machine (2) Parts tumbling conveyor (3) Centrifugal blasting wheel (4) Media cycling & cleaning system (5) Dust collector-ventilator system (6) Automatic freezing system (7) Push-button control panel (8) Insulated, sealed cabinet (9) Auxiliary cabinet refrigeration system.

Another has reduced deflashing costs as much as $13.00 per thousand pieces. Still another reports direct labor savings that range from 87% on 16" I.D. O-rings up to 97% on small rings.

The Wheelabrator Deflasher completely eliminates expensive hand operations . . . such as buffing, hand tearing, and knife trimming—while deflashing at speeds 20 to 300 times faster than conventional methods.

This is an entirely new method of removing flash. CO_2 is injected into the deflashing chamber to freeze the flash, but *not the part*. Deflashing media is then hurled against the parts. The impact fractures and removes the frozen flash without damage to the soft, unfrozen part.

For the full story of the benefits of Wheelabrator Deflashing, write for Bulletin 178-D.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR
RUBBER DEFLASHER

WHEELABRATOR CORPORATION, 644 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario
A subsidiary of Bell Intercontinental Corp.

General Electric Makes Eddy-current-coupling Drives

And they're dependable drives. The complete line includes water-cooled and air-cooled eddy-current couplings. We call them KINATROL* drives. Ratings are from 1 to 150 horsepower, operating from standard a-c power.

A General Electric KINATROL drive is not just another eddy-current coupling. For instance, in the water-cooled coupling, water control is packaged. You'll see much less external piping. Furthermore, the coupling is protected from flooding—and the air gaps are dry, preventing corrosion.

KINATROL couplings are compact, field proven and dependable. General Electric has had a good deal of experience in the engineering, manufacturing, and application of packaged adjustable-speed drives. And we know how important service is to a customer.

KINATROL —a good product, with the kind of service you can depend on. Please call your nearest General Electric Sales Office for further details.

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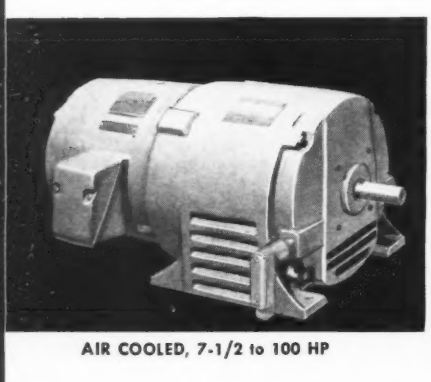
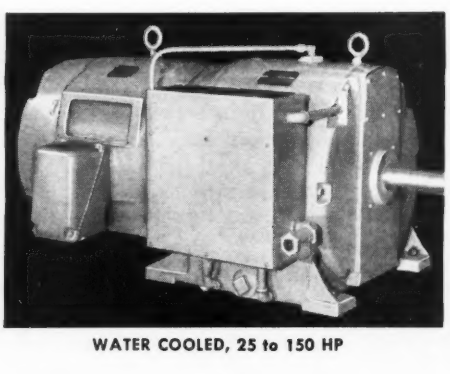
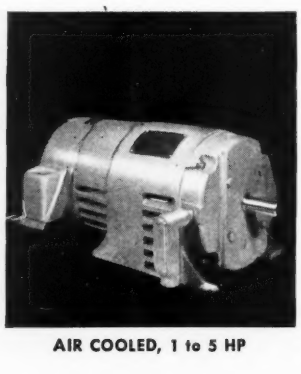


AIR COOLED, 7-1/2 to 100 HP



WATER COOLED, 25 to 150 HP



AIR COOLED, 1 to 5 HP

DIRECT CURRENT MOTOR AND GENERATOR DEPARTMENT

GENERAL ELECTRIC

ERIE, PENNSYLVANIA

Photograph taken with the cooperation of Pretty Products, Coshocton, Ohio, and The Ceramaflex Division of U. S. Ceramic Tile Company, Canton, Ohio.

PLIOFLEX takes the stumbling block out of new flooring

The idea was a natural — ceramic tiles for flooring set in 9″ x 9″ rubber grid sheets. It opened new markets, suggested myriad designs. And it would make flooring resilient, quiet, easy on the feet, easy and economical to install.

The stumbling block: finding a low-cost rubber that wouldn't deteriorate and discolor with age.

Then a leading manufacturer tried PLIOFLEX 1773. Its cost was right. So were its physical properties. And its good color retention and ultraviolet resistance licked the age-color obstacle. What's more, PLIOFLEX offers top processing ease, maximum uniformity and outstanding molding characteristics. Result? Fewer rejects—more profit.

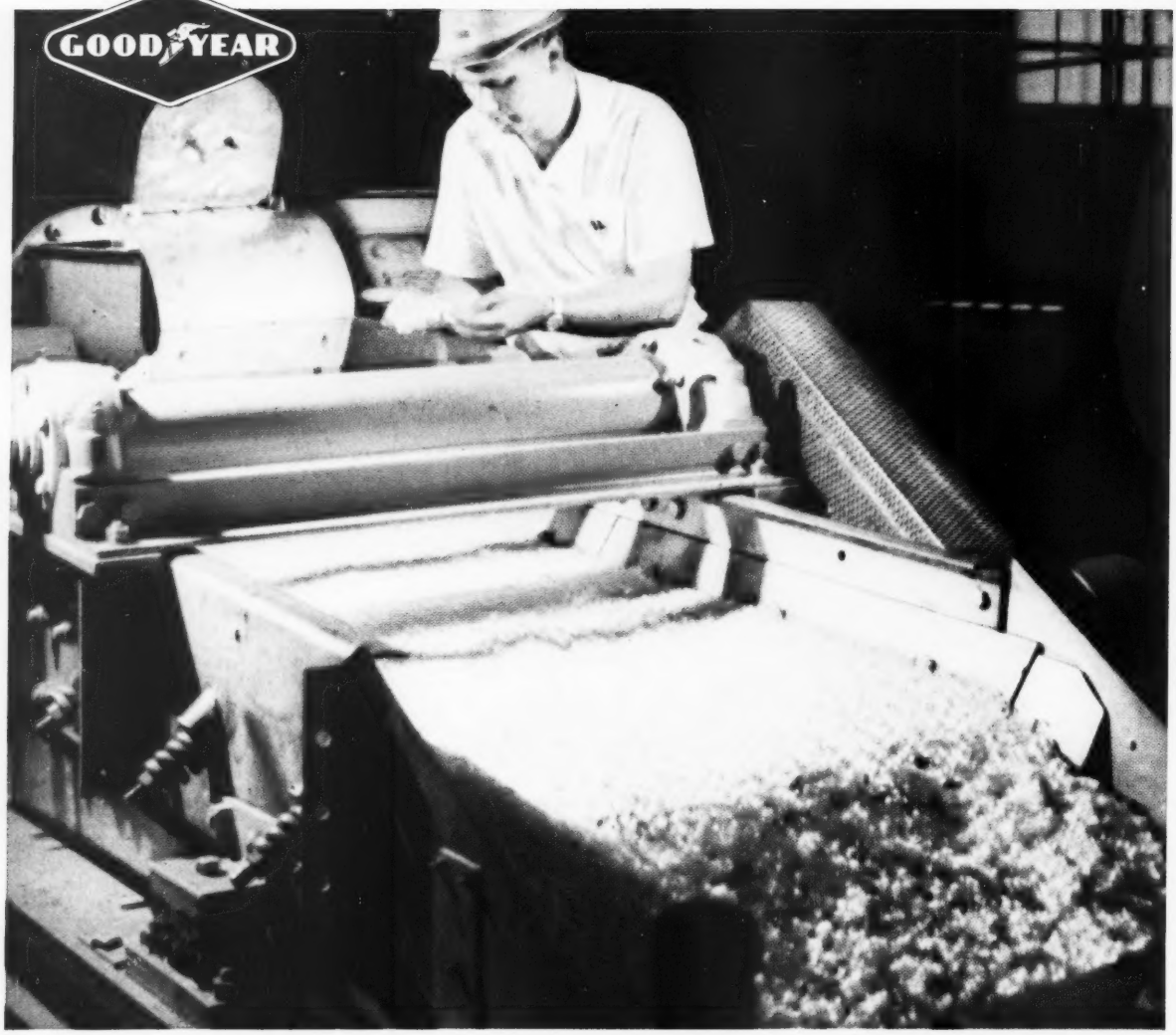
If you want to invade a new market or improve an old product, look into PLIOFLEX. For full details and outstanding technical help, simply write Goodyear, Chemical Division, Dept. K-9418, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

CHEMICAL DIVISION

Plioflex—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

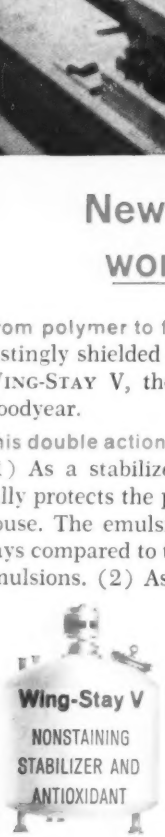


New Wing-Stay V hasn't discolored this polymer—won't stain—will protect against degradation!

From polymer to finished product, this rubber will be lastingly shielded from oxygen and heat. The secret? WING-STAY V, the new *nonstaining* antioxidant by Goodyear.

This double action of WING-STAY V pays big dividends. (1) As a stabilizer, easily emulsified WING-STAY V fully protects the polymer in the dryer, baler or warehouse. The emulsion is so stable it lasts *at least* 30 days compared to the one-day life of other antioxidant emulsions. (2) As a base antioxidant, WING-STAY V gives polymers greatly increased protection. Example: A WING-STAY V fortified rubber displayed almost 200% greater resistance to creep (decay under stress) as did a competitive antioxidant, under exactly the same conditions of exposure.

If you want to step up your product's resistance to oxidation, investigate WING-STAY V. Full details plus expert technical assistance are yours for the asking when you write Goodyear, Chemical Division, Dept. K-9418, Akron 16, Ohio.



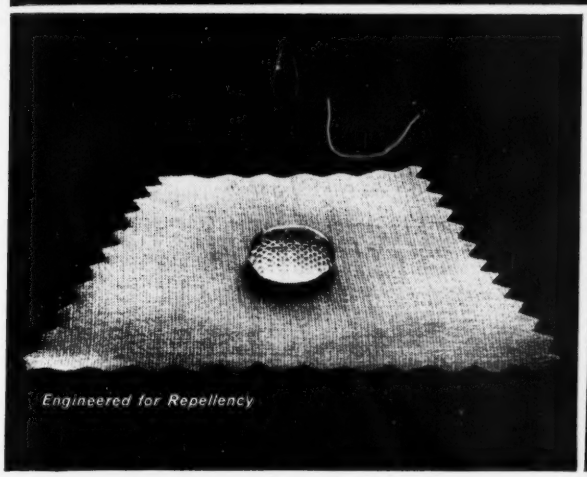
Lots of good things come from

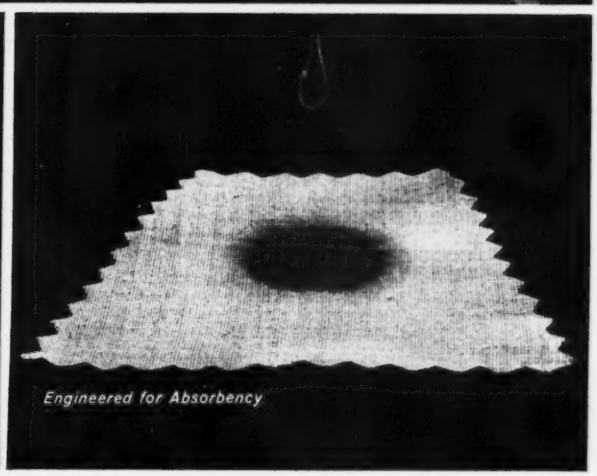
GOODYEAR

CHEMICAL DIVISION

Wing-Stay—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

An example of Avisco Rayons in Industry





There's an application for Avisco® rayon in your business

The big news in industry today is the increasing use of Avisco rayon fibers. Versatility is the reason. Avisco rayon can be custom engineered to meet your end-use requirements.

Need strength? Avisco rayon fibers add backbone, tensile and flex life to beltings, burst strength to hoses, tensile and tear strength to coated fabrics and laminated paper, film and foil.

Need absorbency (or repellency)? Avisco rayon fibers are used extensively in medical and hygienic products.

Need superior filtration? Avisco rayon fibers are produced in a wide range of precise micron diameters to control porosity and improve efficiency.

Whatever you make, there's a way you can save time and money with Avisco rayon fibers engineered to your specific requirements. Find out now.

QUICK REPLY COUPON 6-18

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Company_____

Address_____

City_____ Zone____ State_____

AVISCO® RAYON

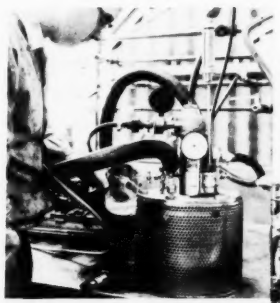
AMERICAN VISCOSE CORPORATION, 350 Fifth Avenue, New York 1, N. Y.

MEET BURT SMART— United Carbon District Sales Manager and philatelist.

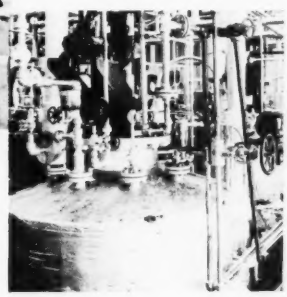
Serious stamp collecting demands a patient search for the rare stamp – the collector's item. With all the new stamps being issued these days, the collector must check constantly to avoid missing stamps he needs to complete sets.

In the United Carbon Research and Development Laboratories a patient search is always in progress for the rare—the as yet unmade black masterbatch which will better serve our customer's need.

THE PATIENT SEARCH



United Carbon takes pride in the development of its new black masterbatches. Top-flight bench-scale and pilot-plant operations help make these new products possible. This small reactor polymerizes test batches of synthetic rubber under closely controlled conditions.



Large intermediate equipment in United Carbon's R & D Pilot Plant confirms research findings and translates them into production items. Highly instrumented reactors similar to this one help in the continuing quest for improved product and process development.

United Carbon keeps a weather eye on present conditions in the rubber industry so that it can forecast tomorrow's needs. This permits a continuing parade of new and better black masterbatches to satisfy your demands.

In its pilot plant at Baytown, United Carbon studies in original equipment design and application have made possible major contributions to the industry. A recent example is the unique United-Barclay process which has improved quality by providing a method of continuous coagulation. It produces uniform, highly dispersed additions of extender oil and solid components in salt-free polymer. This means superior unpigmented SBR rubbers and black masterbatches.

The elaborate pilot operation performs "the patient search" for new and better technology so that tomorrow's masterbatches will be ready when needed. It can provide test samples in quantities from 20 pounds up.

Recently, the Company has spent over half a million dollars modifying and replacing equipment to keep its pilot plant tops in the industry. Today, it serves customers by developing BAYTOWN® brand of black masterbatches into the best products available.

BAYTOWN — The Birthplace of Black Masterbatch

For more information on the entire line of high-quality BAYTOWN black masterbatches, contact:

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UNITED CARBON

High road or low road . . . fabrics figure as key structural material

On the drawing board: orbiting space stations (top) fold to fit in rocket nose cone, inflate with gas. Astronauts are protected by space suits of special coated fabrics.

In the development stage: fabric fuel tanks (left) can be anchored or towed by submarine for underseas storage. Right: fabric pressurized hemispheres for on-the-bottom mining.

Problem: build orbiting space stations—durable, yet light and compact for stowing aboard rockets. *Problem:* build giant tanks to store fuel deep in the ocean—light enough for towing, strong enough for long-term anchorage. *Solutions* under consideration: specially engineered fabrics.

High strength-to-weight ratio, flexibility, portability, toughness: these are the basic properties which make fabrics indispensable in exploration. And the special properties which can be engineered into fabrics are nearly endless.

Since the days of clipper ships, Wellington Sears fabrics have seen service around the world. Even *beyond* it . . . recently a Wellington Sears fabric was tested successfully in a drag balloon designed to slow space vehicles in orbit. Hardly a need exists for which we have not developed and produced fabrics—in cotton, man-made fibers and countless combinations of the two.

Call on our research facilities and staff of industrial-fabric specialists for sound technical assistance on any project involving fabrics. For a copy of illustrated booklet, "Fabrics Plus," write Dept. G-11.

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FIRST in Fabrics for Industry

For mechanical goods, coated materials, tires, footwear and other rubber products

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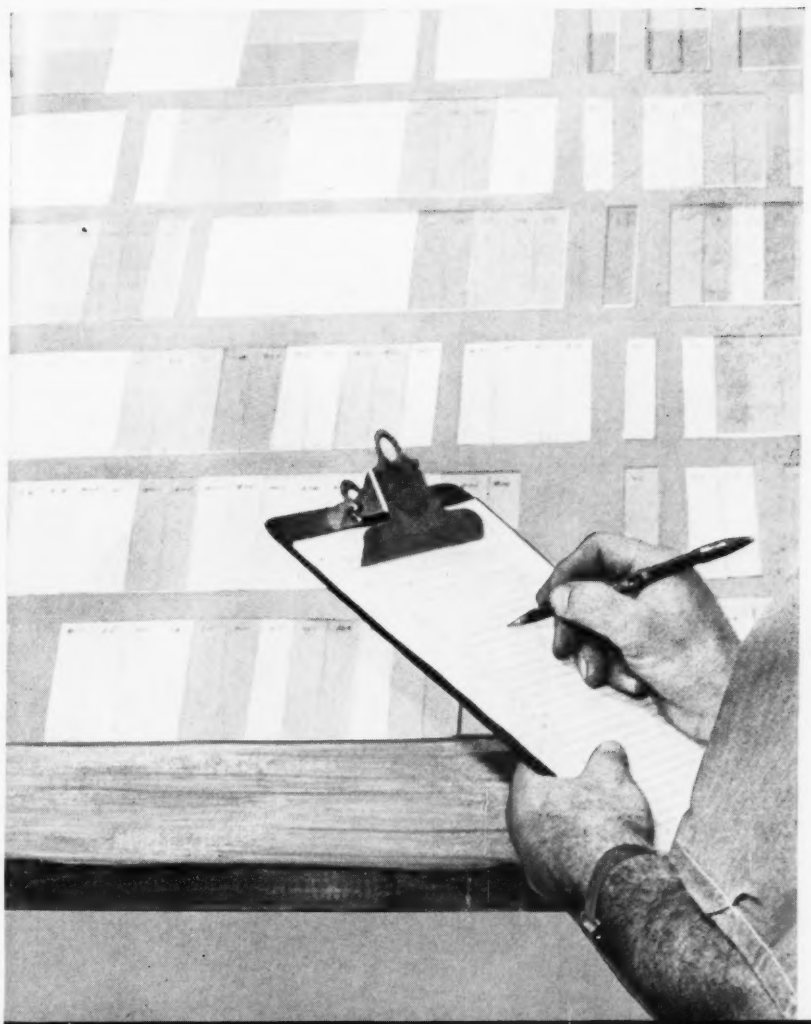

THE PENNOX SERIES

General purpose amine-type

PENNOX A—Slightly discoloring amine-type antioxidant effective in both dry rubber and latex. Provides good high temperature aging in latex.

Nonstaining, nondiscoloring phenolic types

PENNOX B—Good antioxidant for Hevea and SBR vulcanizates and raw SBR polymer.

PENNOX C—Exceptionally resistant to discoloration in light-colored latex products; provides good protection for Hevea and SBR vulcanizates.

PENNOX D—Excellent antioxidant for latex products, dry Hevea and SBR compounds.

For effective age resistance Pennox Antioxidants

In the Pennox series you'll find a dependable age resister suitable for most rubber compounding situations. Pennox antioxidants protect Hevea and SBR vulcanizates, raw SBR polymer, and latex products from the deteriorating effects of heat and oxidizers . . . also provide superior gas fading protection for latex, and minimize discoloring of fabrics coated or used in contact with latex products.

For detailed information on the Pennox series, write or ask your Pennsalt representative for Bulletin S-151, Pennox Antioxidants; and Bulletin S-152, Pennox Antioxidants for Latex. Evaluation samples available on request.

Pennox is a trade name of Pennsalt Chemicals Corp.

See our complete listing in Chemical Materials Catalog

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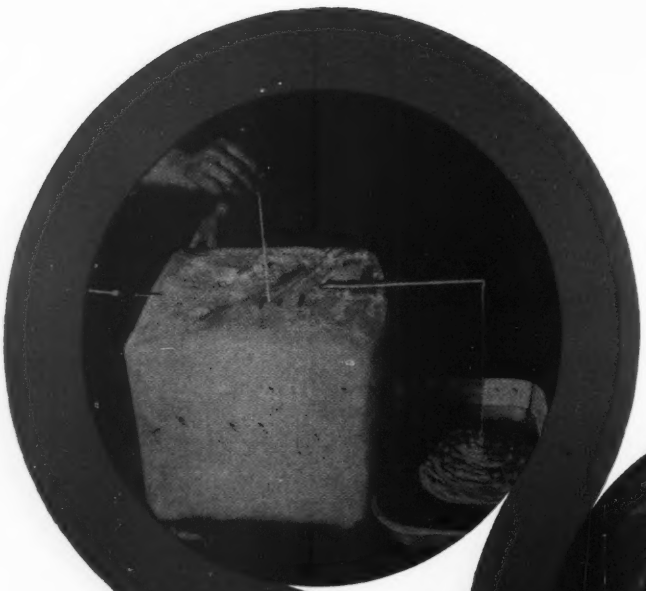
PENNSALT INTERNATIONAL, PHILADELPHIA, PA.
VONDELINGENPLAAT, ROTTERDAM, HOLLAND



Mobilplex EP grease has good pumpability over wide ranges of temperature and shear rates. Here, Mobilplex EP is pumped through a 24-foot coil of $\frac{3}{8}$" tubing frozen in ice at 15 F . . . remains pumpable, permits continuous delivery even at critical pumping rate.

Mobilplex EP resists both water wash and runout caused by heat. In this demonstration, an immersion heater is used to boil water in a conventional mesh vegetable strainer coated with Mobilplex EP. Grease maintains a water-tight film even under these adverse conditions.

Mobilplex EP gives extra protection against wear under heavy and shock loads. Here, two split "bearings" consisting of V-shaped bushings are clamped under equal pressure on a polished steel shaft. The front bearing is lubricated with Mobilplex EP; the rear bearing with a high quality non-EP grease. When bearings are reciprocated in opposite directions, the shaft turns with the rear bearing, indicating frictional resistance is greatest at this point.

EVALUATION SUMMARY
MOBILPLEX EP (M) and 5 Leading Competitive EP Greases (A,B,C,D,E)

PROPERTY EVALUATED	RATING			
	Excellent	*Good*	*Fair*	*Poor*
Heat Resistance	M	A	C,D,E	B
Service Performance	M	A,C,E	B,D	
Extreme Pressure	M,A,C	B,D,E		
Anti-Wear	M,A	B,C	D,E	
Rust Protection		M,B,C, D,E		A
Water Resistance		M,B,C	A,D,E	
Handling Properties		M,A,B C,D,E		
Controlled Bleeding		M,A,C	B,D,E	
Non-staining		M	A,B, D,E	C

This chart summarizes results of an extensive evaluation program at Mobil Research. For complete details ask your Mobil representative.

The Multi-Service Grease with unique Calcium EP Complex. Never before in a single lubricant such a wide range of use . . . such a margin of superiority . . . such a potential for maintenance savings!*

Versatility unparalleled...

Mobilplex ep

A product of Mobil research . . . Mobilplex EP . . . a Multi-Service extreme-pressure grease far superior in quality and range of applications to any multi-purpose grease available.

Mobilplex EP, with a unique Calcium EP Complex, provides maximum protection against wear, rust, washout and heat. Because of its greater versatility, Mobilplex EP goes further than competitive extreme-pressure greases in simplifying your lubricant application, storage and purchasing practices. This new-type lubricant has given industrial machines greater protection while replacing as many as seven other greases. Mobilplex EP has all of the advantages usually associated with EP greases—as well as excellent storage, structural and oxidation stability.

Examination of the Socony Mobil evaluation summary at left shows that in comparison with five competitive extreme-pressure lubricants Mobilplex EP is the only grease excellent or good in every grease quality tested. No wonder aluminum and steel mills, metalworking shops, cement plants, and the chemical and rubber industries are reporting dramatic success with Mobilplex EP.

For full details contact your local Mobil representative, or write Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

*Multi-Service means excellent for all types of anti-friction and plain bearings under various operating conditions up to temperatures in the range of 300 F. and for all types of dispensing equipment.

For a descriptive brochure and specific recommendations, cut out and mail on your letterhead.

Mobil Oil Company, Room 2057D

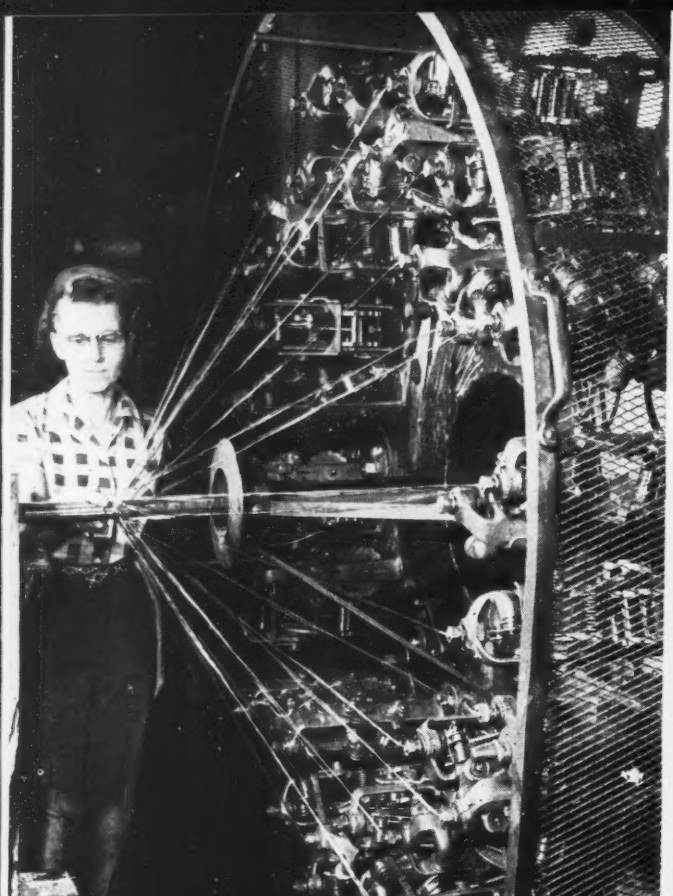
Gentlemen: Re: Mobilplex EP Grease Ad. Please have technical representative call to discuss:

- ☐ Performance results.
- ☐ A specific grease lubrication problem involving water——caustic——acid——heat——.
- ☐ Reducing the number of greases in my plant.

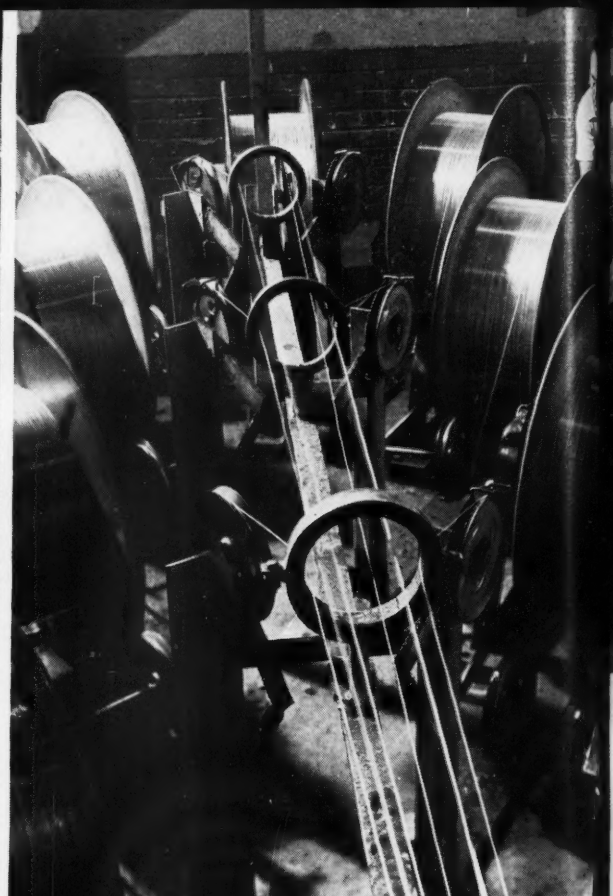
MOBILPLEX EP
THE MULTI-SERVICE GREASE
OFFERING UNEQUALLED POTENTIAL FOR MAINTENANCE SAVINGS FOR LUBRICANT SIMPLIFICATION

Mobil

Proved Petroleum Products . . . Available with a Mobil Program of Correct Lubrication



B. F. Goodrich Company braids multiple strands of steel wire into intricate sinews around rubber tube to help control and resist tremendous internal pressures required of flexible hydraulic hose. Wire such as supplied by Johnson has tensile strengths ranging from 240,000 to 400,000 psi.



Firestone Tire and Rubber Company uses only high tensile steel wire of exacting tolerances in building tire beads. Rapidly entering the bead machine in parallel —three to fifteen wires wide, depending on strength specified—the wires are coated with rubber. Clean bronze finish on Johnson wire assures proper rubber adhesion.

The best names in rubber use Johnson wire for strength and safety in tires and hose

The rubber industry has a sound reputation for producing quality products in advance of its needs by use of imaginative research—painstaking development of production methods—careful selection and testing of component materials.

Goodyear—Firestone—U.S. Rubber—B. F. Goodrich—Thermoid and others have established their names over the years by giving the general public and industry alike—strength, safety and durability in products such as long lasting pneumatic tires and tough pressure hose.

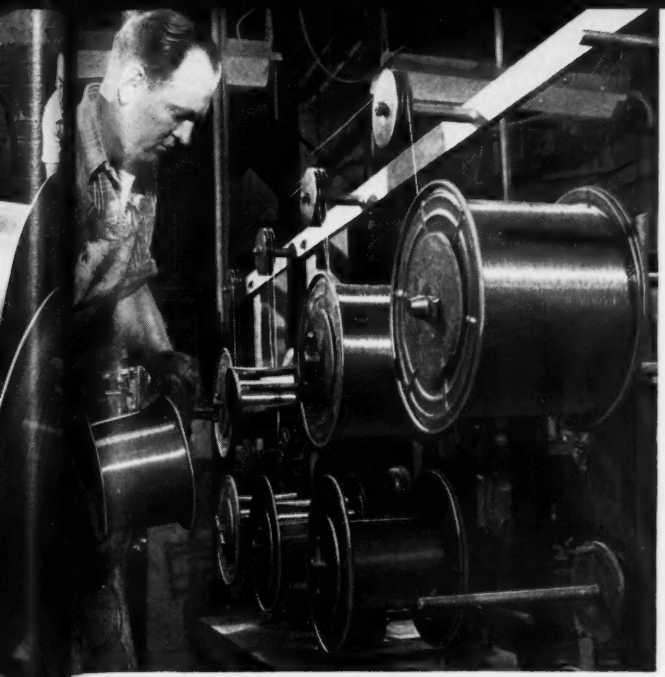
These two products owe their strength in part to the fine steel wires hidden inside them. For it is high-carbon steel bead wire which gives a pneumatic rubber tire—no matter what its size or job, the strength demanded by modern vehicles. Similar wire gives pressure hose its strong sinews which enable it to withstand working pressures as high as 10,000 psi—bursting strength may be three to four times as great.

Take the case of tire bead wire which Johnson supplies to every major tire manufacturer in the country. It is precision-drawn from special high-carbon rods to .037″ in diameter with a tolerance of only .002″—so fine that a 750-pound reel contains 39 miles of wire. Yet, a single strand exceeds 290 pounds of breaking strength equal to a tensile strength of 270,000 psi.

Also the wire must present a clean, unbroken surface and have a good and uniform bronze finish. This finish makes possible tight adhesion between the wire and the rubber surrounding it.

All these qualities contribute to the tire bead strength, help assure the safety of those who ride for work or pleasure on pneumatic tires.

Another special wire made by Johnson for the rubber industry helps rubber hose contain enormous pressures demanded by modern industrial applications. This reinforcing wire is drawn from selected high-



Thermoid Division, H. K. Porter Company, has cut wire rewind loss to ½ of 1% by use of Johnson Discard-a-Spool which eliminates overlaps and tangles, protects wire quality in shipment. The one-way disposable spool weighs only 28 ounces vs 200 ounces for standard spool—slashes tare weight 14 times.

United States Rubber Company wires tires for strength on this bead building machine. The strength comes from the steel wire bead in the edge of each tire. Johnson makes special high-carbon steel wire—.037″ in diameter with tolerance of only .002″ for U.S. and other major tire companies.

carbon steel in diameters ranging from .008″ to .020″ and has exceptional dimensional accuracy—tolerance is plus or minus .0005″.

Johnson hose reinforcement wire is supplied with a special liquor finish to provide maximum adhesion of steel to the rubber which fills the interstices between braids.

The wire is uniformly cast to make possible even spooling and has uniform tensile strength to prevent breaking under the working tension.

These excellent wire qualities, plus careful packaging and prompt delivery, have resulted in Johnson becoming a prime supplier to the rubber industry for hose reinforcement wire.

The outstanding performance of Johnson wire in the rubber industry is typical of the experience in other industries where Johnson supplies aircraft cord wire, armature binding wire, wire for brushes, metal stitching, preformed staple wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire in a wide variety of sizes and finishes.

If you use specialty wires, call one of the offices listed to right and explore the advantages of Johnson quality which combines strength with economy.

The Goodyear Tire & Rubber Company finds that Johnson meets their exacting requirements for tire bead wire which has high tensile strength, twisting strength, elongation and special surface finish. Here parallel tire bead wires uncoil evenly into a bead building machine.

Johnson Steel & Wire Company, Inc.

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Three leading tire manufacturers recently proved, in a series of tests, that RECLAIMATOR rubber adds weather resistance to their tires. In both a dynamic and a static test the tire sidewall compound contained 19% of RECLAIMATOR reclaimed rubber, and was compared pound for pound with the best matching conventional reclaims. Results of both tests show that tires made with conventional reclaims had many weather cracks on the sidewall, but sidewalls of tires containing RECLAIMATOR reclaim had practically none.

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Shows why RECLAIMATOR rubber should be in your compound.

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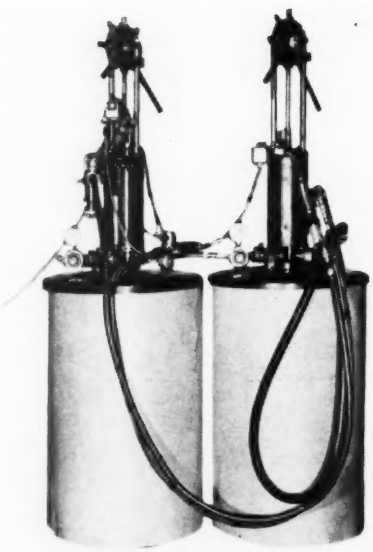
new equipment



Portable urethane rubber mixer/dispenser

Polyurethane Mixer and Dispenser

The Akron Presform Mold Co., Akron 8, O., is now manufacturing an electro-pneumatic portable mixing and dispensing unit for the rotational molding of polyurethane articles. The two-tank (resin and catalyst) unit is capable of up to 60 shots per minute in quantities from 10 to 900 grams and in ratios from 10:1 to 1:1. Each drum is topped by an eight-position turret for rapid changing and dispensing of the materials required in multiple-cavity molds. The portable unit is four- by two- by six-feet high.

Liquid Storage Tank

A new liquid processing or storage tank, featuring a chemically resistive, seamless plastic inner shell and a strong metal outer shell, has been introduced by Bruner Corp., Milwaukee, Wis. The Bruner Duo-Guard tank can be used for storing acids, corrosive liquids, hot water, for ion exchange or demineralizing purposes. With a bursting strength of 500 psi., the volume of the tank is 0.5-cubic ft. Overall length of the tank is 24½ inches; inside diameter, seven inches.

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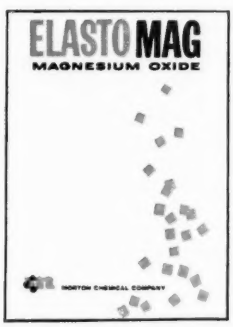
Three activity grades give you ideal process safety for every type of recipe

Cut down on costly throw-away loss caused by scorch. Get better bin stability . . . better states of cure by using an *activity-controlled* ELASTOMAG oxide from Morton. Three precision activity grades of ELASTOMAG—170 (high), 100 (medium), and 20 (low)—let you choose the oxide with a Morton Activity Index (MAI) that's ideal for every stock. New ELASTOMAG Micro-Pellets eliminate dusting problems. No binder or treating agent is used. In the mixer, Micro-Pellets break down to minute particles . . . provide the same superior dispersion as ELASTOMAG in the powdered form.



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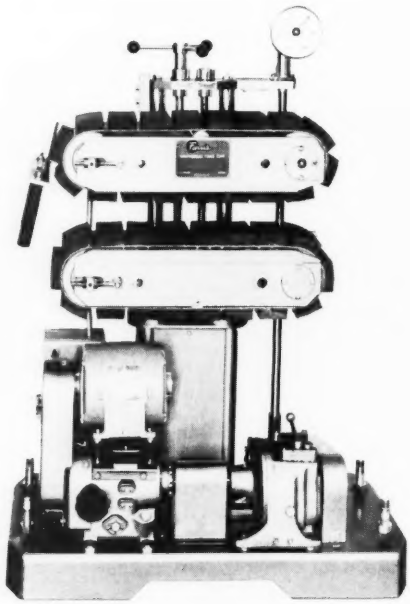

Universal take-off machine

Take-Off Machine

Farris Universal Machine Corp., Palisades Park, N. J., is marketing a takeoff machine for use with any type of extruded tube or profile.

Said to overcome the many limitations of the taper roller type of take-off machine, the new equipment provides a non-slip grip over a wide area of contact, sandwiching the profile between resilient pads mounted on two belts running at identical speeds. The company reports that the contact pressure of the pads is so light no distortion can take place, making the machine useful for any material, rigid, brittle, or flexible. Even extremely thin-walled sections of tubing or irregular shapes can be taken off successfully.

Indicator Valve

Flow Systems, Inc., Corona Del Mar, Calif., has designed a new flow control valve. Its special feature provides for increased safety and operating efficiency by incorporating an outside indicator readily showing the orifice position even from a distance. The opening can be set with great accuracy and locked with an optional handle. Use of an O-ring-style packing almost completely eliminates interior dead space which significantly reduces solidification or precipitation of materials not in motion.

A variety of tips and seats permits various flow requirements, and the valve is available in either manual or air-actuated style up to 10,000 psi.

(*Continued on page 32*)

There **is** better service available in CO_2

LIQUID CO_2 Prompt and reliable CO_2 delivery is only part of the service ThermIce offers you. Each ThermIce trailer is designed to serve as an emergency standby CO_2 tank, should your own equipment or supply source fail you. Every trailer carries its own generator and pumps and can supply either liquid or vapor CO_2 directly into your process line.

DRY ICE The large fleet of new and modern ThermIce trucks at every depot assures prompt service, especially for those unscheduled "emergency" requirements caused by sudden weather changes or public utility failures. • ThermIce trucks carry extra heavy insulation to minimize sublimation. ThermIce dry ice is delivered to you at maximum size, with clean, square edges, eliminating waste in repackaging operations. • ThermIce offers *reliable* dry ice service. Every depot manager is a specialist in routing and scheduling delivery to meet your particular needs.

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Chemical Manufacturers

No. 14

RECLAIM SCORCHED NEOPRENE WITH 4039-Y OIL!

For reclaiming and reconditioning scorched Neoprene, 4039-Y Reclaiming Oil is ideal for both scorched scrap and partly "set-up" stocks.* Tests show that it can also save time and production costs in the reclamation of regular rubber. Only 5% of 4039-Y Reclaiming Oil will completely recondition scorched Neoprene depending on how far such stocks have been set-up. 4039-Y treated stocks can be worked back into the original stock or used as a workaway in other stocks. General properties of 4039-Y Reclaiming Oil are as follows:

Specific Gravity @ 60/60° F.	0.938
Saybolt Universal Viscosity @ 100° F.	40 seconds
Flash Point, C.O.C.	180° F.
Weight per gallon in pounds	7.81
Color	Dark Brown

**P.S. Use "Maglite D" in your Neoprene batches and avoid scorching!*

HALLCO C-311 PLASTICIZES SYNTHETIC RUBBERS AND PLASTICS

This ester type plasticizer is a primary softener for nitro and ethyl cellulose, chlorinated rubber, polystyrene and various other synthetic rubbers. Hallco C-311 also functions as a secondary plasticizer for vinyl resins. Since it is of fatty nature, films containing it should be inhibited to prevent growth of mildew type fungi. When used as a wetting agent for colors and pigments it is helpful in formulation of special inks. Other uses of Hallco C-311 are found in the low temperature processing of Perbunam and Paracril type rubbers. In addition to producing rubber compounds that pass the ASTM Low Temperature Brittleness Test at minus 60° C, it also gives higher tensile strength and improved elongations. Hallco C-311 is also manufactured by The C. P. Hall Company and is available in drums or tank cars.

Samples and data on Hallco C-566 and Hallco C-311 are available on request. Order yours today!

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He's DR. PAUL G. CARPENTER, President of Copolymer . . . and he knows that this "climate" is **man-made**—created by teamwork and a genuine concern for the customer's interests.

A Ph.D. with over 25 years of training and experience in chemistry, research, sales, development and production, he knows that providing customers with quality products and superior services depends on dedicated, all-out effort.

And he knows that at Copolymer this is accomplished through a chain of direct, efficient action by which each departmental link consistently complements and strengthens the other. At Copolymer it's called **Action Management!**

The foundation of Copolymer's success is its "customer's climate." And DR. CARPENTER knows that it's the reason more and more customers look to Copolymer for continued pioneering and leadership in the synthetic rubber industry.

CONTACT ONE OF THESE COURTEOUS, COMPETENT SALES REPRESENTATIVES, TODAY!

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Copolymer offers its customers the unique advantages of having its management functions centralized in the main plant. This is Copolymer's Action Management Organization, and it benefits customers with speed and efficiency in creating new and better products to fill the needs of the synthetic rubber industry.

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The Copolymer Research and Development Division has helped produce ideas and basic research for many "firsts" in the industry. Copolymer was first in continuous large-scale production of "cold rubber" . . . first to develop and commercially produce concentrated cold rubber latex for foam rubber . . . first to develop and produce a superior carbon black masterbatch without using a chemical dispersing agent.

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The guiding principle of Copolymer's Industrial and Community Relations Division is this: There's more to creating and marketing superior products than expert alignment of molecules. Only by fostering mutual respect, pride, a sense of purpose and a cohesive spirit among employees, neighbors and customers do we successfully maintain an atmosphere of service.

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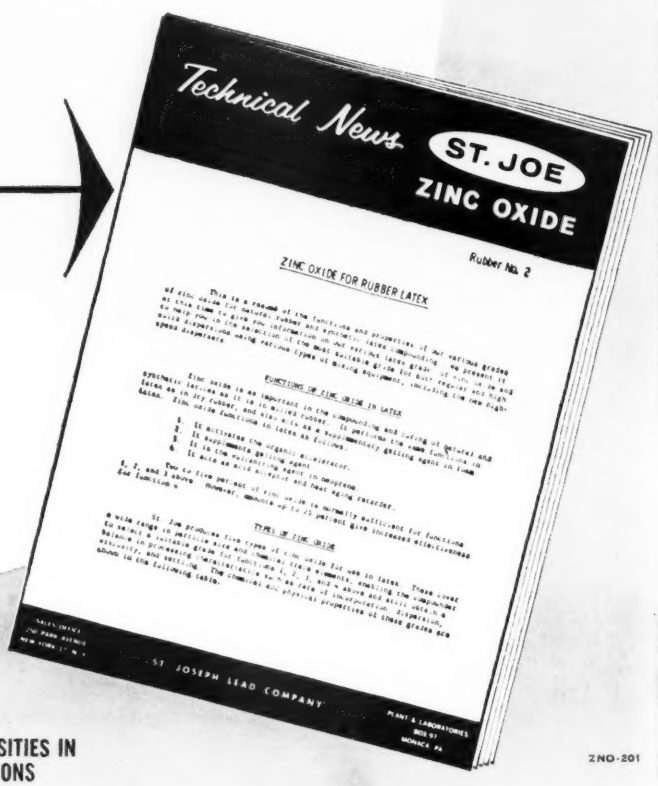

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CONCENTRATION OF DISPERSING AGENT

SUPPLEMENTARY GELLING ACTION

EFFECT OF PROLONGED BALL MILLING

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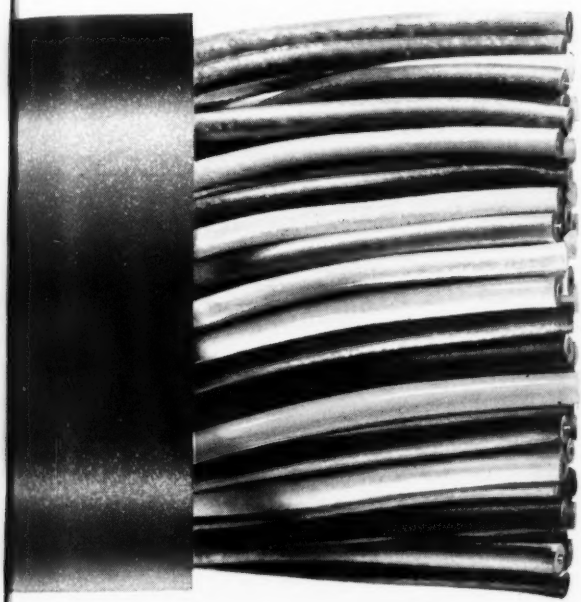

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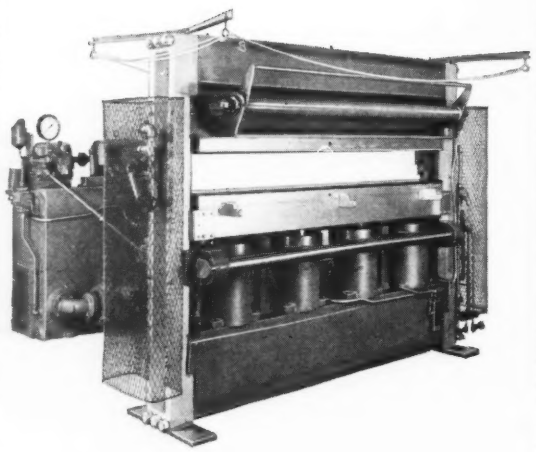

=5594 — 200-ton Tire Fabric Splicing Press; 4 rams @ 8" each; working pressure, 2000 P.S.I.; pressing surface, 84" x 9"

French builds rugged hydraulic presses to meet a full range of pressroom needs. Shown here is another example—a 200-ton Tire Fabric Splicing Press—which is but one of many types of French Presses dependably serving the rubber industry. French Presses are known everywhere for efficient, quality production. Send us your requirements now.

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new equipment

(*Continued from page 24*)

Drum tumblers have built-in hydraulic lifts

Drum Tumblers with Hydraulic Lifts

Drum tumblers with built-in hydraulic lifts for raising 55-gallon steel drums to proper height for clamping into position on the tumbler are now being marketed by The U. S. Stoneware Co., Akron, O.

A special modification of the company's standard line of Fig. 730 drum tumblers, the units incorporate the additional feature of a loading platform which can be raised and lowered under control from a three-way hydraulic valve. The drum to be clamped into the tumbler is placed on the platform, inside the holding clamps. The platform is then raised under power from a separate motor which operates the hydraulic system. When the drum has reached the proper level for clamping, the clamps are closed and locked around the drum. The hydraulic-lift platform is then lowered, and the drum is rotated by the main tumbler motor.

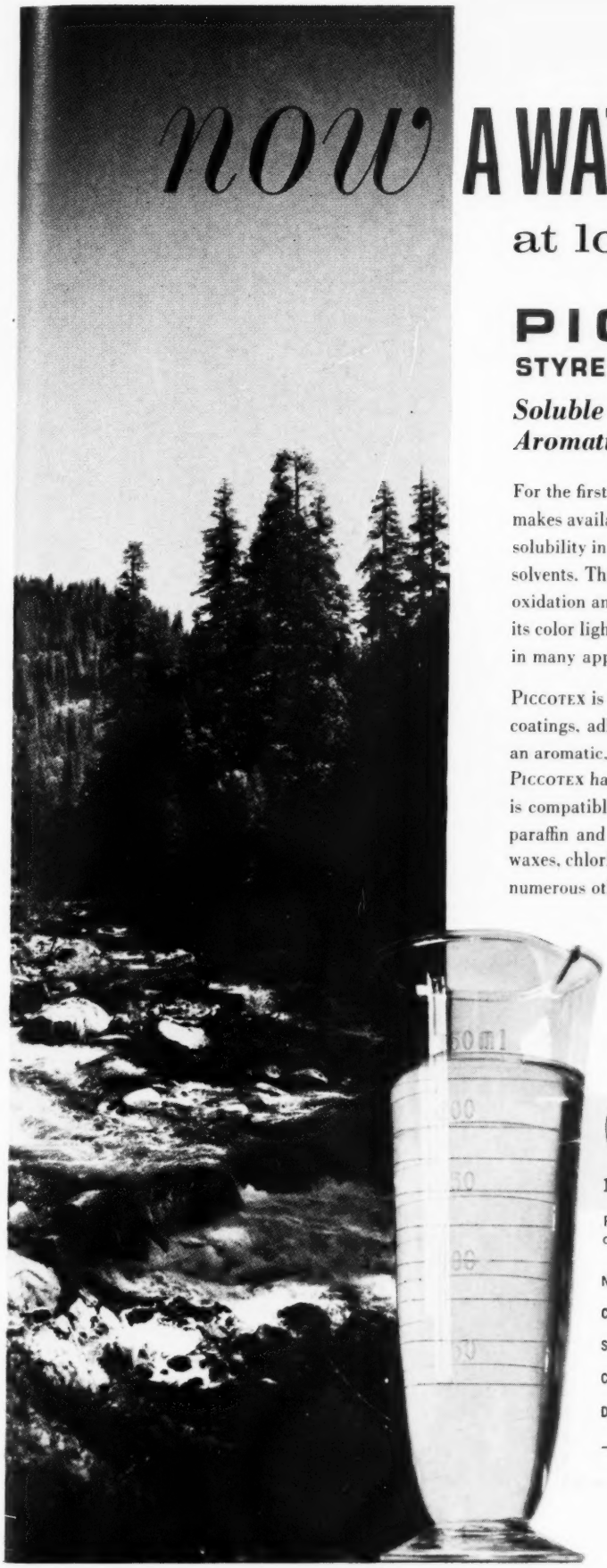
The manufacturer states that special advantages of the hydraulic-lift tumblers are the reduced danger of physical injury to workmen, when heavy drums are loaded manually, and the greater speed of drum loading.

Hydrocarbon Analyzers

Scientific & Process Instruments Division of Beckman Instruments, Inc., Fullerton, Calif., is marketing two new total hydrocarbon analyzers.

The two instruments, Models 108 and 109, detect and measure trace concentrations of hydrocarbons in gases, vapors, or the atmosphere. Model 108 is for panel mounting, and Model 109 is for laboratory or field use.

The analyzers are designed for such applications as: controlling solvent and paint vapors in production



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at low cost!

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STYRENE COPOLYMER RESIN

Soluble in Aliphatic, Chlorinated and Aromatic Hydrocarbons

For the first time in chemical history, the creation of PICCOTEX makes available a hard, styrene-derived resin with **revolutionary** solubility in chlorinated, aromatic, and entirely aliphatic solvents. This new product exhibits excellent resistance to heat, oxidation and ultra-violet exposure. Its cost is low enough and its color light enough to make pigment saving an important factor in many applications.

PICCOTEX is pouring into hundreds of applications in the paint, coatings, adhesives, textile and rubber industries—wherever an aromatic, alkali-and-acid resistant, colorless polymer is desirable. PICCOTEX has iodine and saponification values of zero. PICCOTEX is compatible with polystyrene, rubber, commonly used plasticizers, paraffin and—at selected concentrations—microcrystalline waxes, chlorinated waxes, terpene resins, rosin derivatives and numerous other compounds.

For **whiter** whites and brighter colors with less pigment, specify low cost PICCOTEX. PICCOTEX is available in solid form in 100°C and 120°C melt-point grades, or in mineral spirit solutions.

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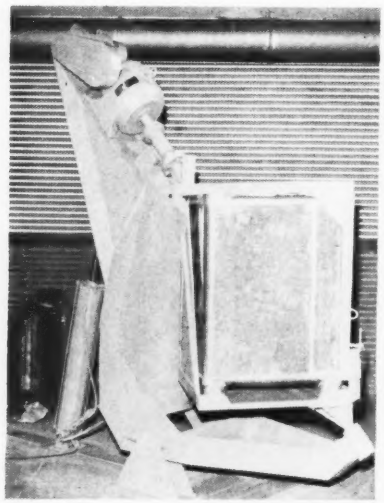
new equipment

plants, measuring concentrations of explosive or toxic gases in fuel handling areas, detecting explosive mixtures in mines, and monitoring purity of inert gas streams.



Tote Tumbler makes Tote Bin a blender

Tote Tumbler

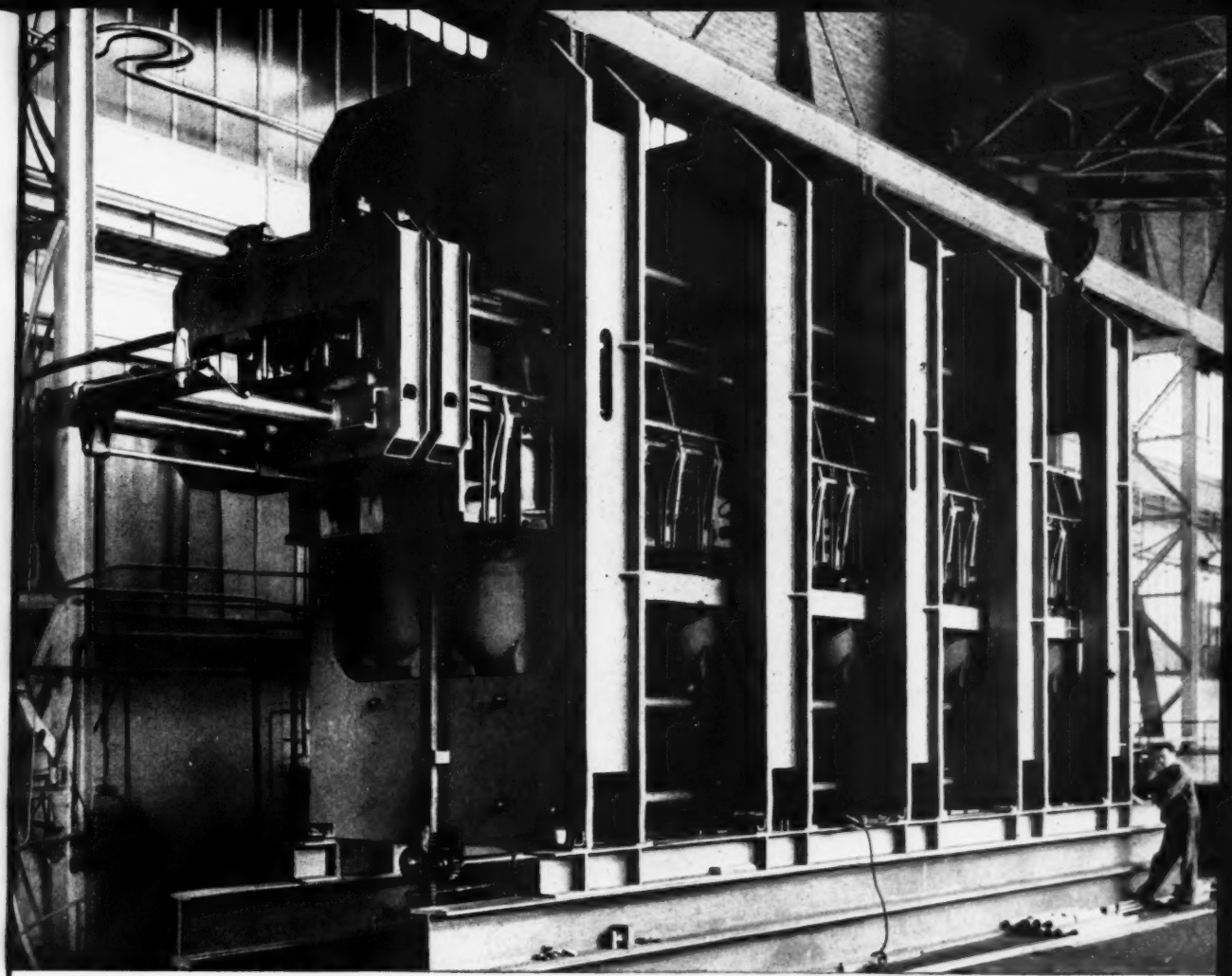
Tote System, Inc., Beatrice, Neb., has developed the Tote Tumbler, a device which holds a Tote Bin and rotates it by its diagonal corners, effecting a close blend in about five munutes. By placing the Tote Bin on an automatic scale, it can be fed with different materials from screw-type Tote Tilts or conveying systems. The contents then can be tumbled and quickly taken to use point, eliminating the need of separate weigh hoppers, blenders, and conveyors.

Aircraft Tire Test Dynamometer

A completely automatic dynamometer capable of simulating 250 mph. touch-down or take-off rates is being offered by Gilmore Industries, Inc., Cleveland, O.

Wheel speed *vs.* time, wheel load *vs.* time, and brake torque *vs.* flywheel velocity are simultaneously controlled by two independent systems. Opposite panels of the console control a corresponding wheel carriage of the 84-inch flywheel.

Each system has three X-y drum type followers and one X-y recorder. While one wheel is being tested, the other panel is locked out, permitting its advance preparation for test. Manual override of the automatic controls is possible at any time, and fail safe circuits and limit switches are provided to increase safety and reliability.



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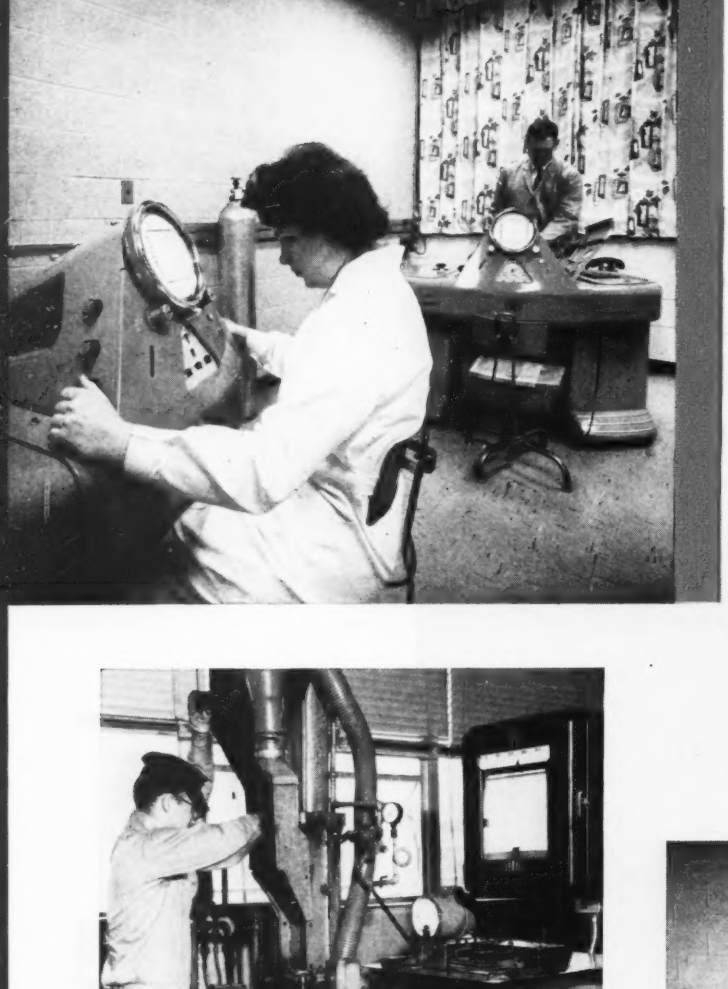

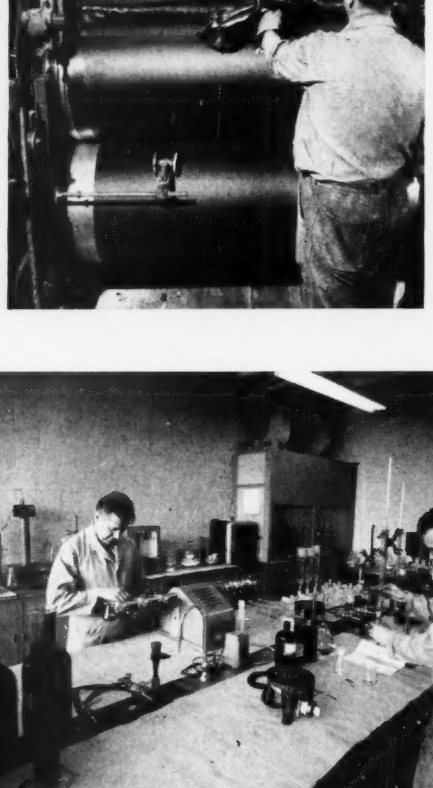

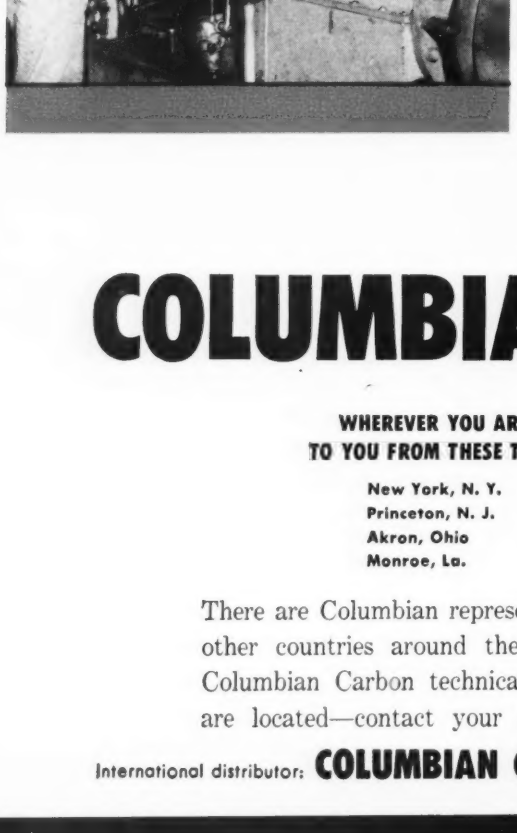

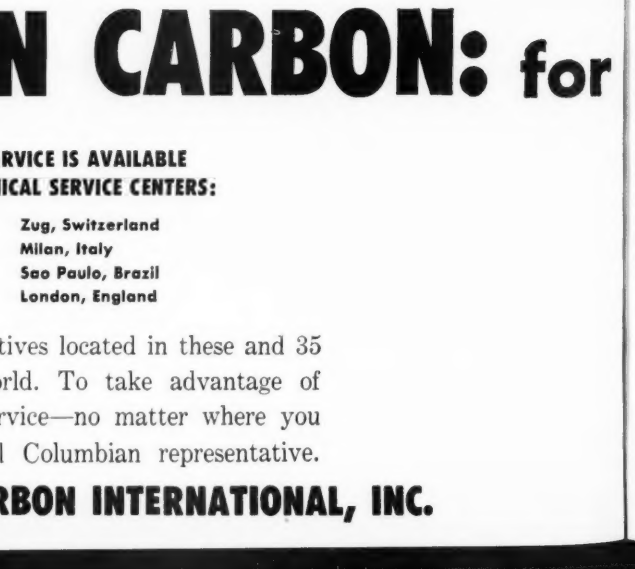

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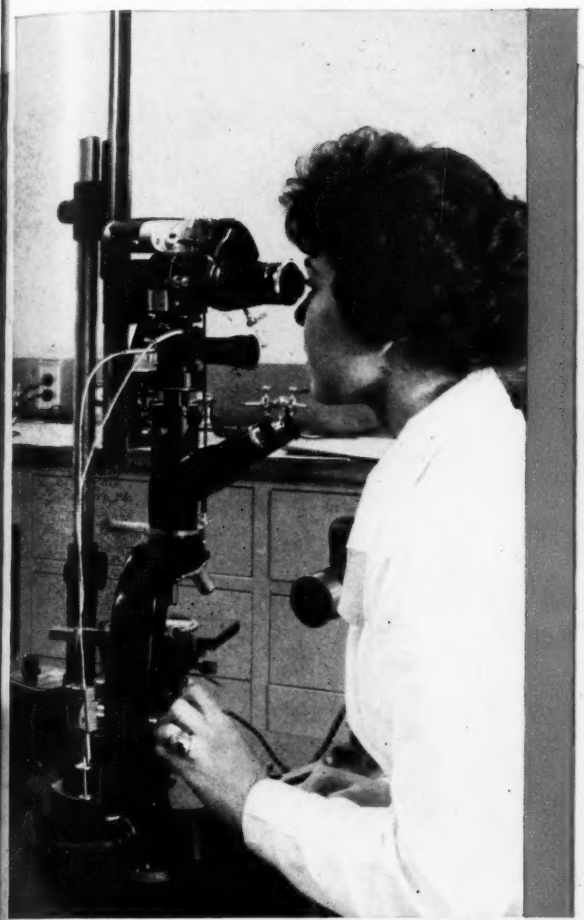

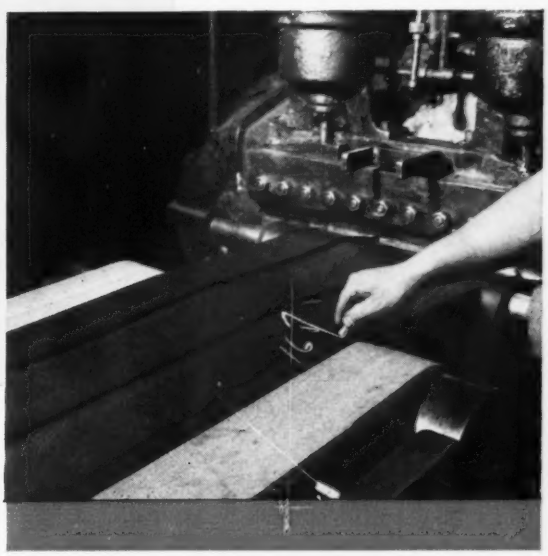

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VULCANIZED VEGETABLE OIL
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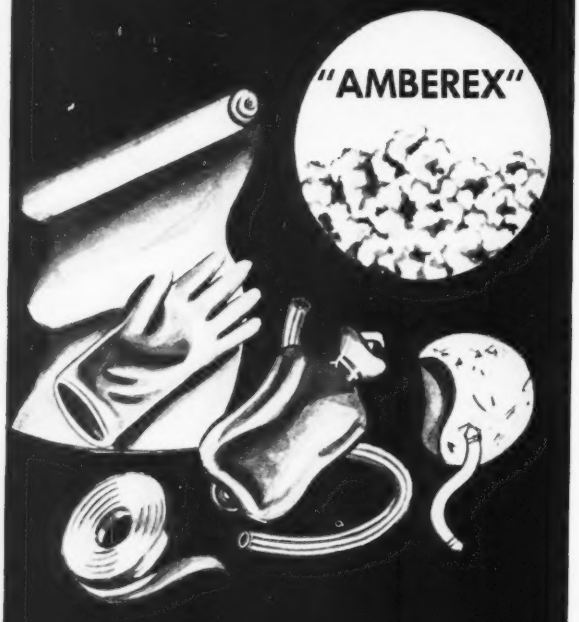

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The Amberex type of Factice® is made from various kinds of vegetable oils and in various degrees of polymerization. All are light colored, transparent, free from chlorine and have practically no ash.

There are six different Amberex types, each having properties for specific applications. The selection of the proper Factice® for a compound is important. Send us your formula for our suggestions. All formulas held in strict confidence. Our trained staff will help in selecting the proper vulcanized vegetable oil for your need . . . Factice®, White, Brown, Neophax or Amberex.

THE STAMFORD RUBBER SUPPLY CO.
STAMFORD, CONN.

new materials

One-Part Urethane Coatings

Single-package system, oilfree polyurethane coatings known as Chemglaze Coatings are now being marketed by Hughson Chemical Co., Erie, Pa.

The products cure by reaction with atmospheric moisture at room temperature or on baking without the addition of catalysts. They remain usable from two to seven days in an open container and for a year or more in an unopened container. The coatings can be applied by spray, dip, flow, brush, or roller methods.

The materials are available in flexible and hard versions and either clear or color pigmented. Chemglaze Coatings are reported to combine the advantages of oil-modified types (application ease, good can stability, and short drying time) with the features of two-part systems (heavy-duty durability, superior physical and chemical characteristics).

The products can be made in a wide range of flexibilities without the use of plasticizers, and the degree of elongation (up to 500%) can be formulated for almost any specific application. These coatings are reported to adhere tenaciously; resist ozone, chemicals, solvents and oils; and remain flexible to minus 40° F. The products can improve durability, scuff-resistance, and appearance of rubber and other resilient materials such as in conveyor or V-belts, mounts, automobile window channels, hose, gaskets, toys, and household products. Hard coatings are recommended for maintenance and decorative finishes for all types of rigid surfaces (wood, metals, glass, concrete, plastics) such as for heavy-duty floor areas, sporting goods, refinery and chemical process equipment, trucks, and street markings.

Apex 750, Conductive Vinyl

Apex 750, a semi-rigid vinyl compound with electrical conductive and anti-static properties, is being manufactured by Apex Tire & Rubber Co., Pawtucket, R. I. The company reports that the material may be extruded, molded, or calendered. Suggested uses are as a replacement of copper braid in communication wire, shielding wire for high-voltage and coaxial cables, and conductors for ignition wire. Other uses include semi-conductive tape, conductive impregnated paper, and conductive gaskets and tubing.

(*Continued on page 46*)

Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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How can we help you make better rubber-base adhesives?

Making any of the adhesives in this picture? Then you'll be interested in the property control you can get with Durez phenolic resins as ingredients of your adhesives.

For an example, take hardness (or softness) in a nitrile rubber solvent cement. You can vary this important film property to the exact degree you want, just by varying the rubber-to-resin ratio. It's that simple.

Doing so, you end up with a nitrile-base thermosetting cement that cures at room temperature to a strong, permanent bond. (For a *very* strong bond, it can be cured at 250°F. but this is seldom necessary.) The bond resists heat and grows stronger, not weaker, with age.

Let's suppose you want to make an adhesive for bonding nitrile rubber—cured or uncured—to metal. There's a Durez resin that greatly simplifies this job. It gives strong bonds to copper, brass, aluminum, tin plate, steel, stainless steel—and even gives medium-good adhesion to zinc plate and galvanized steel.

Formulating neoprene or natural-rubber cements? Nitrile or high-styrene-butadiene latex adhesives? Again, Durez resins give you the same sort of property control, plus certain specific advantages we'll be glad to tell you about.

We do not make adhesives, but we can put 40 years of resin experience to work for you.

DUREZ PLASTICS DIVISION

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NEW, FROM
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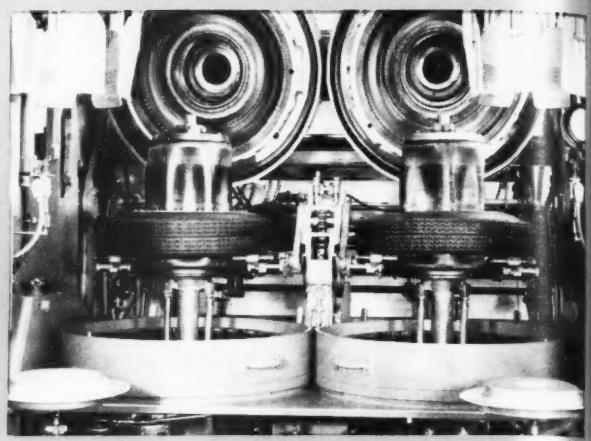
THE WORLD'S
FINEST
PASSENGER TIRE
PRESS

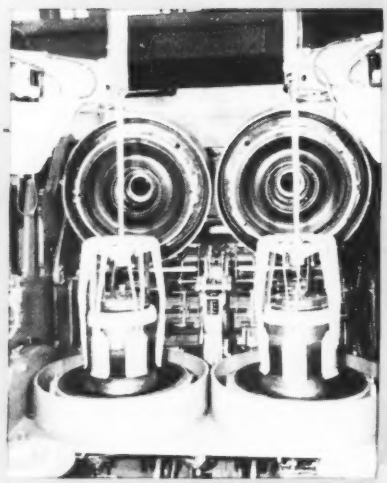
THE 40"
BAG-O-MATIC®

Fast Operating Cycle — 51 to 54 Seconds.
Positive, Accurate Tire Positioning And Handling.
Wide Curing Size Range With Only Simple Adjustments.
Maximum Production With Minimum Maintenance.

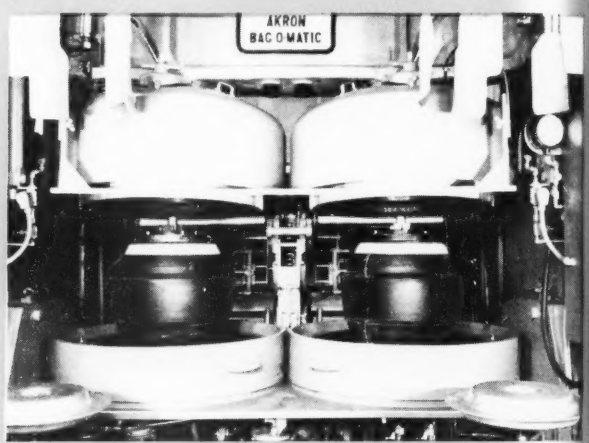
NOW,
LESS THAN 1 MINUTE FOR A COMPLETE OPERATING CYCLE



1 Center Mechanism lifts tires. Unloading arms have moved under tires.



4 Uncured tires are positively positioned over center mechanisms and registered on lower bead rings.

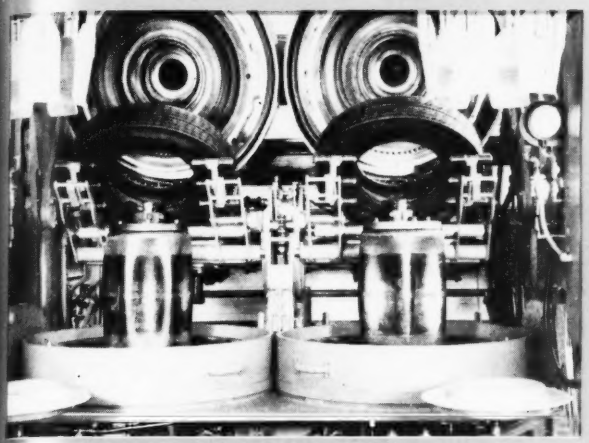


5 Press closes, shaping and curing the tires.

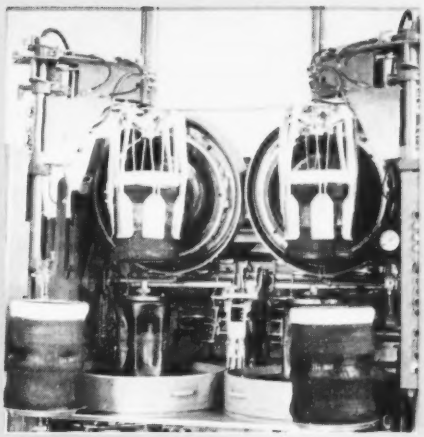
IMPORTANT OPERATING FEATURES

1. Press operating cycle shortest ever! *LESS THAN ONE MINUTE.* Averages 51 to 54 seconds from automatic activation of "press open" circuit through unloading, loading, shaping to fully closed. Accomplished by a faster drive plus a "speed-up" in the loading and unloading operations.
2. All new vertical chuck loader accurately and positively places uncured tire over the bladder onto the lower bead ring — *EVERY TIME!* Six loader shoes assure roundness of casings. Four uncured tires are ready for next two cures. (See illustrations #3 and #4)
3. Completely new unloader arms move under cured tires to carry them upward and out the rear of the Bag-O-Matic. Tires are supported under both sides and across the rear of the sidewalls. Cam controlled rear tipping action insures accurate movement of the tire into the post cure inflator. These new unloading arms are effective on today's wide variety of tires including more flexible, two-ply tires, 70 level, and Nylon low-profile casings. (See illustrations #1 and #2)
4. The new "Jet-Ejector" *eliminates the need* for an elaborate vacuum system. This water-

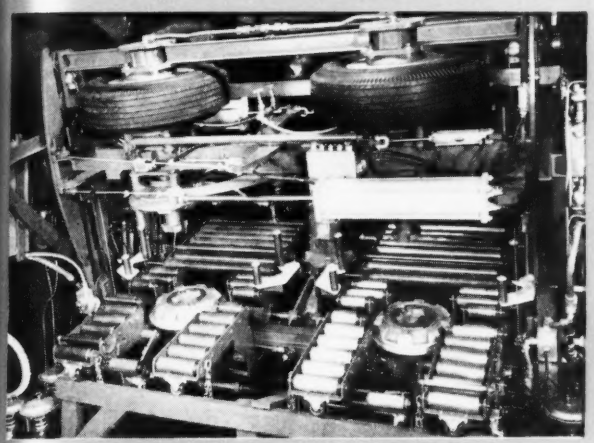
LOOK TO McNEIL FOR



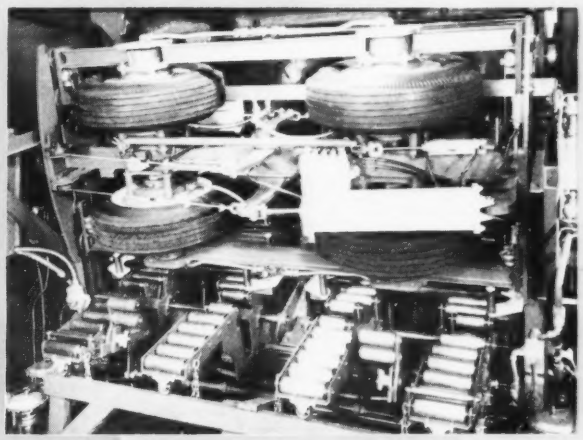
2 Unloading arms remove tires from bag assembly and slide tires onto takeaway conveyor (or Post Inflator).



3 Loading chucks position uncured tires over bag assemblies.



6 Two tires being held in position for post inflation.



7 Two additional tires are accepted by Post Inflator as tires are unloaded.

OF THE NEW 40" BAG-O-MATIC®

operated Venturi unit creates vacuum as required for rapid bladder drainage and positive bladder folding for subsequent automatic loading. Provides dependable vacuum for each press individually.

5 50 to 100% better bladder life with Passenger Tire Bag-O-Matics®. Many tire plants are enjoying bag life averages above 1000 cures.

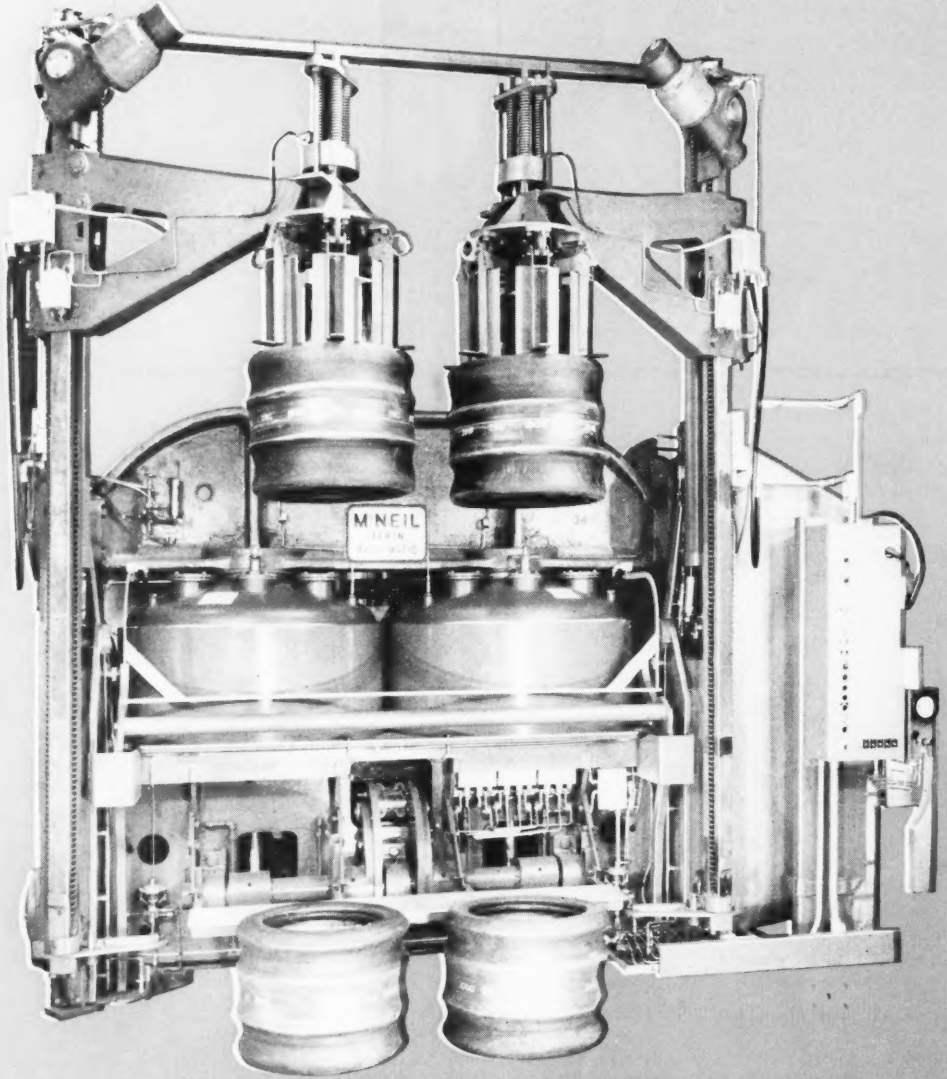
6 McNeil Load Indicating Gauges accurately measure the elongation of the side links as the Bag-O-Matic® goes "on squeeze". Gauges show the exact pressure on the individual molds. This allows fast and accurate press adjustment for the tire being cured and the internal pressure being used.

7 Complete versatility — a range of 12" through 17" rim diameter tires are accepted by the 40" Bag-O-Matic® with simple adjustments—no basic press changes are needed.

8 By an overwhelming majority Bag-O-Matic presses continue to be the first choice of tire manufacturers, world-wide.

LEADERSHIP IN CURING PRESSES

INDUSTRY'S STANDARD FOR TRUCK TIRE CURING SINCE 1951



FOREIGN LICENSES: Francis Shaw & Company, Ltd., Manchester, England; Vickers-Ruwolt Proprietary, Ltd., Victoria, Australia; Anciens Etablissements Ripiquet, Bobigny, France; Fried, Krupp-Harburger Eisen-und Bronzewerke A.G., Hamburg, Germany; Luigi Pomini, Castellanza, Italy; The Kobe Steel Works, Ltd., Kobe, Japan; Aktiebolaget Abjorn Anderson, Svedala, Sweden.

THE McNEIL 55" BAG-O-MATIC®

- Accurate, concentric positioning of uncured tires onto the lower bead rings. Chucks stay in position during lowering of top rings to established bead height, and insure correct bag location.
- Complete versatility — press handles 15" through 24" bead diameters and there are no pots to change.
- 55" Bag-O-Matic® presses will handle single bead, dual bead, or wire tires.

McNEIL AKRON

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NATURAL RUBBER *Research* LOOKS TO THE FUTURE

PA-80 and SP Rubber.. Extrude and Calender *BETTER*

For easing manufacturing problems connected with extruding and calendering, you can't beat the close tolerance properties of Superior Processing (SP) Rubber or PA-80.

SP rubber provides the kind of speed and precision in extruding, calendering and moulding that plant superintendents dreamed about—until SP came along to make those dreams reality. PA-80 is a concentrate that, mixed with any Natural or SBR, makes them as good as SP.

SP Rubber and PA-80 were developed at Natural's laboratories in Malaya and England. So were such research firsts as Anti Crystallizing Rubber, Hevea-Plus and other graft polymers, and low-cost-production high-yielding rubber trees. And, because research knows no limits, there is more to come.

Keep your eye on Natural research—it has a bright future.

For information about how SP Rubber or PA-80 will work in your plant, just write or call for a Natural Technical Service Representative.

NATURAL RUBBER

A PRODUCT OF NATURE plus SCIENCE

Natural Rubber Bureau

1108 16th St., N.W., Washington 6, D.C.

(*Continued from page 38*)

Easy-Processing Silicone Rubber

Easy-processing silicone rubber, Silastic 241U, is now available from Dow Corning Corp., Midland, Mich. This latest addition to the Silastic materials reportedly bands readily on mill rolls without crumbling and requires very little mill softening. It is soft, non-tacky, and has good green strength. The compound is designed to meet the 40 durometer requirements of the following specifications: MIL-R-5847D, Class 2A and 2B; MIL-STD-417, Type T, Class TA 405 B3, Class TA 405 E3, Class TA 407 E3; and AMS 3301 C.

The material is said to retain physical strength and flexibility after long exposure to temperatures from minus 80 to plus 500° F. Other claims include good electrical properties and low compression set. Finished parts can be manufactured by molding, extruding, or calendering, with low shrinkage.

Silastic 241U is supplied without a vulcanizing agent, permitting the user to determine the best system for his own purposes. A standard Silastic base formulation also is available from Dow Corning.

Non-Staining Antioxidant

Wing-Stay V, an alkylated, styrenated phenolic rubber chemical developed specifically as a non-staining antioxidant for SBR and nitrile rubber, is now available from Goodyear's chemical division, Akron, O.

The product is a pale amber liquid with a specific gravity of 1.00 and a viscosity of 1800 cps. (25° C.). This antioxidant is recommended for use in rubber, latex, and foam applications. It is reported to give persistent antioxidant protection when incorporated in raw polymers even through the drying operations and into the end-products. It protects against discoloration by oxides of nitrogen and other products of combustion. Wing-Stay V, moreover, has been designed to provide the optimum balance of raw polymer color, ease of emulsification, emulsion stability, control of gel build-up, resistance to staining and discoloration, and maximum antioxidant activity.

Ank-Seam, Non-Flammable Cement

Anchor Adhesives Corp., Flushing, N. Y., has developed a non-flammable adhesive for bonding polyester, polyurethane, and natural rubber latex foam. Designated Ank-Seam, it differs from other non-flammable adhesives in that it is free from highly toxic chlorinated solvents such as carbon tetrachloride. The manufacturer says the product is faster drying than any foam cement previously available and is so light in color as to be nearly invisible.

Silicone Rubber Base Compound

Union Carbide KW-1920 silicone rubber base is a new masterbatch compound which is said to combine intermediate low-temperature flexibility with good oil resistance. It has a useful temperature range of minus 120° to plus 450° F. and a volume swell in fluids equivalent to that of dimethyl silicone rubber compounds, which have a brittle point of only minus 80° F. The material is preconditioned for easy processing and is reported to have a low shrinkage factor. It is neutral in color and has a specific gravity of 1.08. A six-hour postcure at 300° F is recommended, and typical applications are in seals, diaphragms, and gaskets. The material is supplied only in an uncatalyzed condition.

Union Carbide Corp., silicones division, New York, N. Y., also announced a change in the designation of its silicone rubber base compound Y-3131, to KW-1330.

Plasticizer for PVC

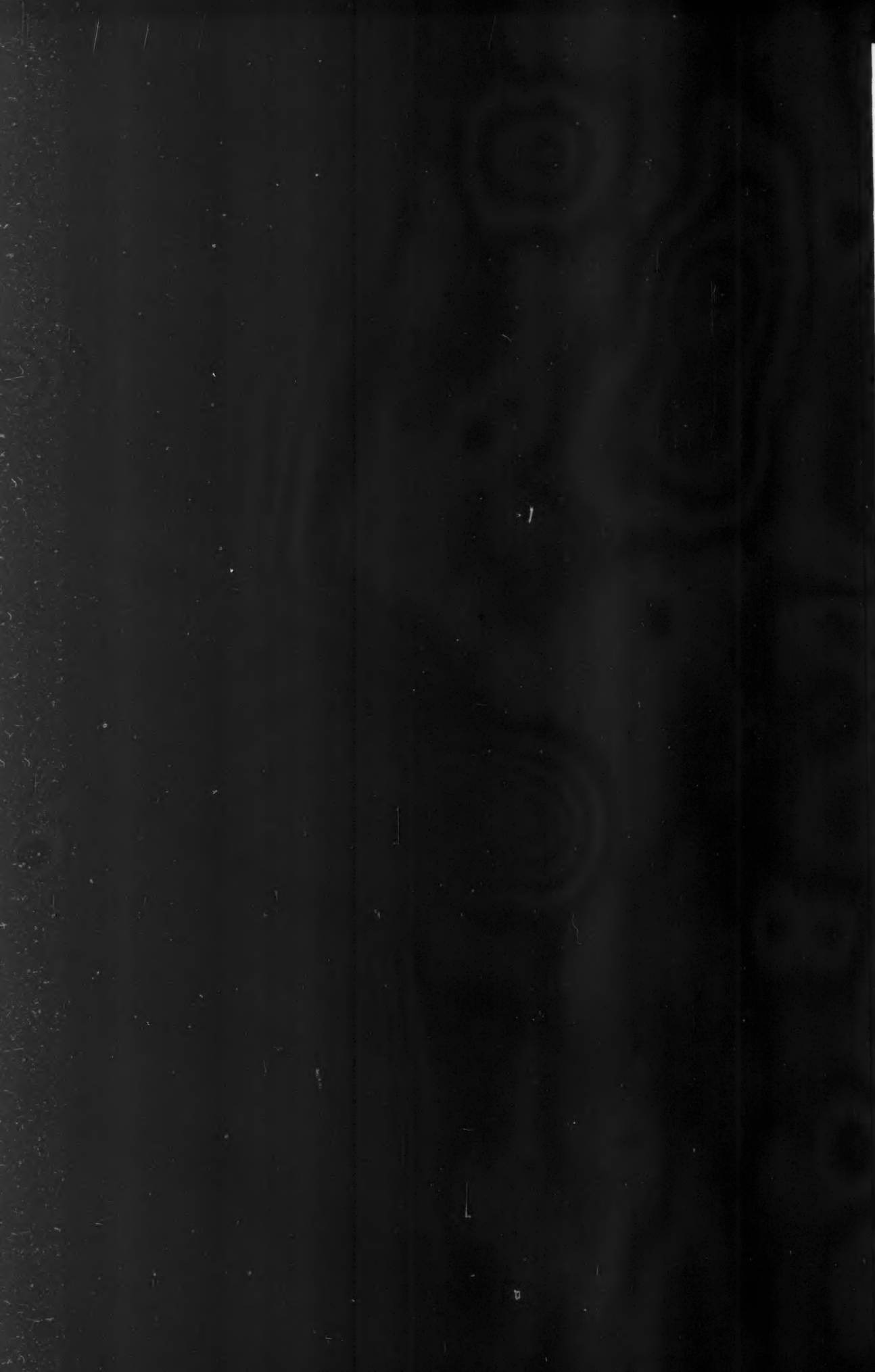
A permanent plasticizer for PVC, Santicizer 411, a general-purpose polymeric plasticizer, is now available from Monsanto Chemical Co., St. Louis, Mo. This material is an adipic acid-glycol polyester and is reported to be unique in its excellent resistance to extraction either by mineral oils or soapy water. It is recommended for use in formulations for baby pants, coated cloth, adhesive-backed film, and in high-density foamed vinyl for outer wear and upholstery.

100% DNPT Blowing Agent

The blowing agent, di-nitrose pentamethylene tetramine (DNPT), previously only available at a concentration of 80% maximum, now may be had in 100% concentration from A. & S. Corp., Randallstown, Md.

Papain as a Latex Coagulant

The commercial availability of papain, an effective protein digestant enzyme used to coagulate raw latex, has been announced by the Miles Chemical Co., Elkhart, Ind., which indicates that previous quality inconsistencies of the material have been overcome by tight manufacturing procedures. Exhaustive test programs have shown the new papain to have remarkable consistency and high product quality, permitting the company to assure reproducible results from batch to batch. The new material has greater pH range of activity at moderately elevated temperatures than other proteolytic enzymes. The company also is able to match the product and its enzymatic activity to the customer's particular need.



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These famous trade names — Bellows . . . Valvair . . . Hunt . . . Sinclair-Collins . . . Hyquip . . . Jackson — have many things in common. Two are outstanding. These companies are known to industry as leading suppliers of pneumatic, hydraulic and electronic products. And, they all are part of International Basic Economy Corporation (IBEC).

To make it easier for you to select the most economical combination of related products best suited to your needs . . . to provide you with application engineering recommendations for entire control systems . . . to render unmatched service . . . these sources of specialized products have been combined into one engineering, sales and service organization — Bellows-Valvair.

The Bellows-Valvair Pneumatics Division will engineer, sell and service all Bellows, Valvair and Hunt products involving the use of air. The Bellows-Valvair Hydraulics Division will engineer, sell and service Hunt, Sinclair-Collins and Hyquip hydraulic products, as well as Berry-Dowty gear pumps and motors. The Bellows-Valvair Electronics Division will engineer, sell and service all related electronic devices.

Consolidation of all sales and service under the name Bellows-Valvair combines the knowledge and experience of over 300 design, production and field engineers. The resources of this group are at your service, ready to aid you in the engineering and application of pneumatics, hydraulics and electronics, to solve your production problems.

Valvair SINCLAIR-COLLINS

New Bulletin FP-62 will give you more information on the divisional product groupings. For your copy, contact the field office near you (listed in the Yellow Pages and Thomas' Register, Volume IV), or write to Bellows-Valvair, Akron 9, Ohio, Dept. RW-1161.

1200-C

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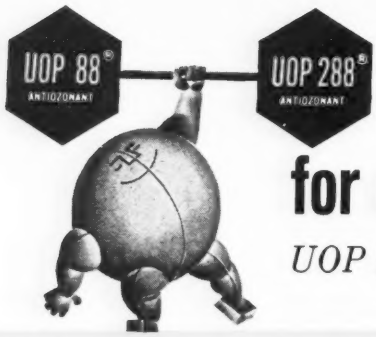


for complete ozone protection...

UOP Antiozonants and the UOP Field Specialist

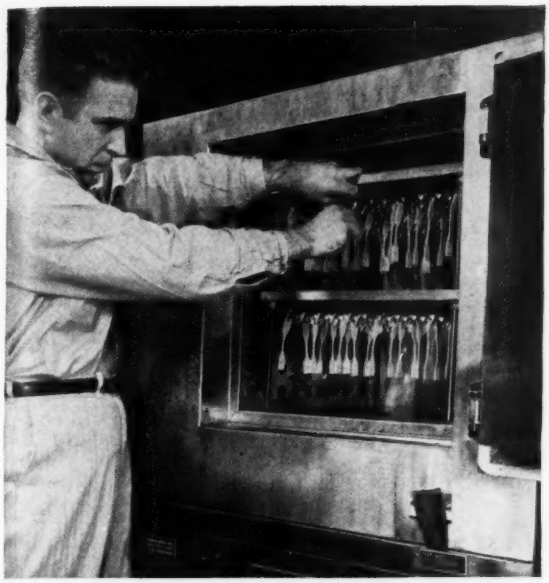
Increasing ozone concentrations in many areas make it more and more necessary that your products have the best possible protection against ozone cracking.

Excellent chemical antiozonants...UOP 88 and 288 . . . that have proven their effectiveness in hundreds of challenging applications are readily available.

But in protecting against ozone attack, an outstanding antiozonant is only the beginning of the story. The type of natural or synthetic polymer used . . . the curing system . . . the reinforcing agent . . . the service conditions under which the product is to be used . . . all of these factors must be correctly interpreted, co-ordinated, and balanced to provide the most effective protection.

That's where the services of UOP's Field Specialist become important. Qualified by training and long personal experience, he can draw on the results of years of continuous research and testing at UOP's laboratories . . . covering the use of thousands of antiozonant formulations on a wide variety of base stocks. His recommendations may necessarily cover many phases of your operation . . . and they will represent the latest, most effective method of combating the ozone problem for greater customer satisfaction.

To arrange for an early visit from a UOP Field Specialist, without any obligation, call or write our Products Department today.



At UOP research laboratories, cabinet testing under exaggerated conditions of stress and ozone concentration proves effectiveness of formulations for various product applications.

Test strips below show results of proper and improper compounding. Both strips had 3 phr of UOP 88. This provided excellent protection in bottom strip which was properly compounded. Improper selection of compounding ingredients caused failure in top strip.

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new products

Goodrich color undertread

Goodrich Jet Tires Show Color When Worn

The B. F. Goodrich Co., Akron, O., is making airplane tires that change color when they are worn through enough to need replacing. A layer of colored rubber covering the entire undertread area is exposed when any portion of the tire wears through. Goodrich has been building a white undertread into jet tires for the U. S. Air Force for more than a year and has experimented with red, green, and orange compounds compatible with tread rubber stocks.

Silicone-Rubber Traffic Markers

Movatron and Fixatron are traffic control markers utilizing silicone-rubber. The Movatron is equipped to rise and lower automatically, and the Fixatron is a stationary marker.

Both are available either with internal illumination or non-illuminated. The Movatron is electrically powered by a manual or automatic control and can also be controlled by radar or radio. A thermostatically controlled internal heater prevents freezing in the winter. The markers themselves are contained in compact, individual housings buried in the street without the necessity of expensive trench excavation.

(*Continued on page 52*)

DO YOU HAVE A COPY ON YOUR DESK?

COMPOUNDING INGREDIENTS FOR RUBBER

THIRD EDITION

Immediate Delivery—the Third Edition of the only book of its kind ever offered the Rubber Industry.

It contains over 600 pages of editorial content, with authoritative descriptions for each type of material or ingredient. Names and addresses of all suppliers are included. A partial list of contents follows:

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Part Three—NATURAL AND SYNTHETIC RUBBERS, LATICES, AND RECLAIMS

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BALE CUTTERS

★ Automatic ★ Bench Type
★ Standard

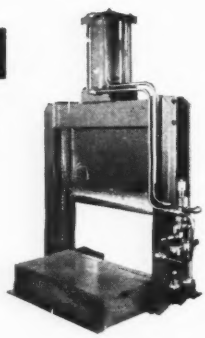
A Model For Every Requirement

Cut Bales of Crude, Synthetic, Reclaimed Rubber . . . Plastics and Resins.

NEW
FULLY AUTOMATIC 29"

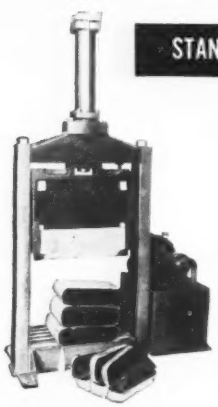
Automatically feeds, measures and cuts bales. Discharges cut pieces to take-away conveyor or tote box. Slice thickness adjustable from 2" to 6". Knife cuts on continuous time cycle or can be manually operated if desired. A fully self-contained unit. Knife 29" — stroke 23".

SMALL BENCH TYPE 24"



For laboratory use or compounding at Banbury.
Cuts full size synthetic Bales or Pre-cut Crude Rubber.
Air Operated cushion action knife actuated by dual electric safety controls.
Easily mounted on Bench or Table — Knife 24" — stroke 12".

STANDARD 29" & NEW 50" MODELS



Cuts without lubricant.
Bales are advanced on rollers and can be cut into 1" minimum slices.
Cutters are manually operated and safety control valve requires operator to stand clear while knife is in motion.
Knife 29" — stroke 23" or knife 50" — stroke 36".

Write for details today — Your inquiries will have our prompt attention.

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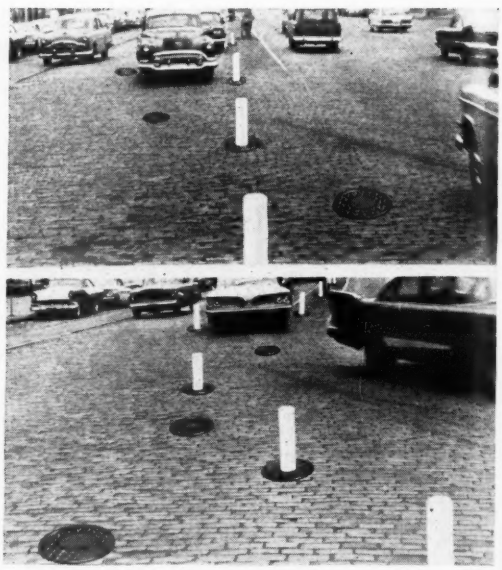
new products

(*Continued from page 50*)



Movatron is an automatic-rising traffic marker and control system that makes it possible to change traffic patterns

Their permanent installation eliminates the hazards of manual distribution and collection of markers.

The silicone-rubber portion is reported to be translucent and to resist weather, heat, color-fading, and sunlight. Tests show the part to be undamaged by tire impact up to 60 miles per hour and to snap back quickly even when bent double at sub-zero temperatures.

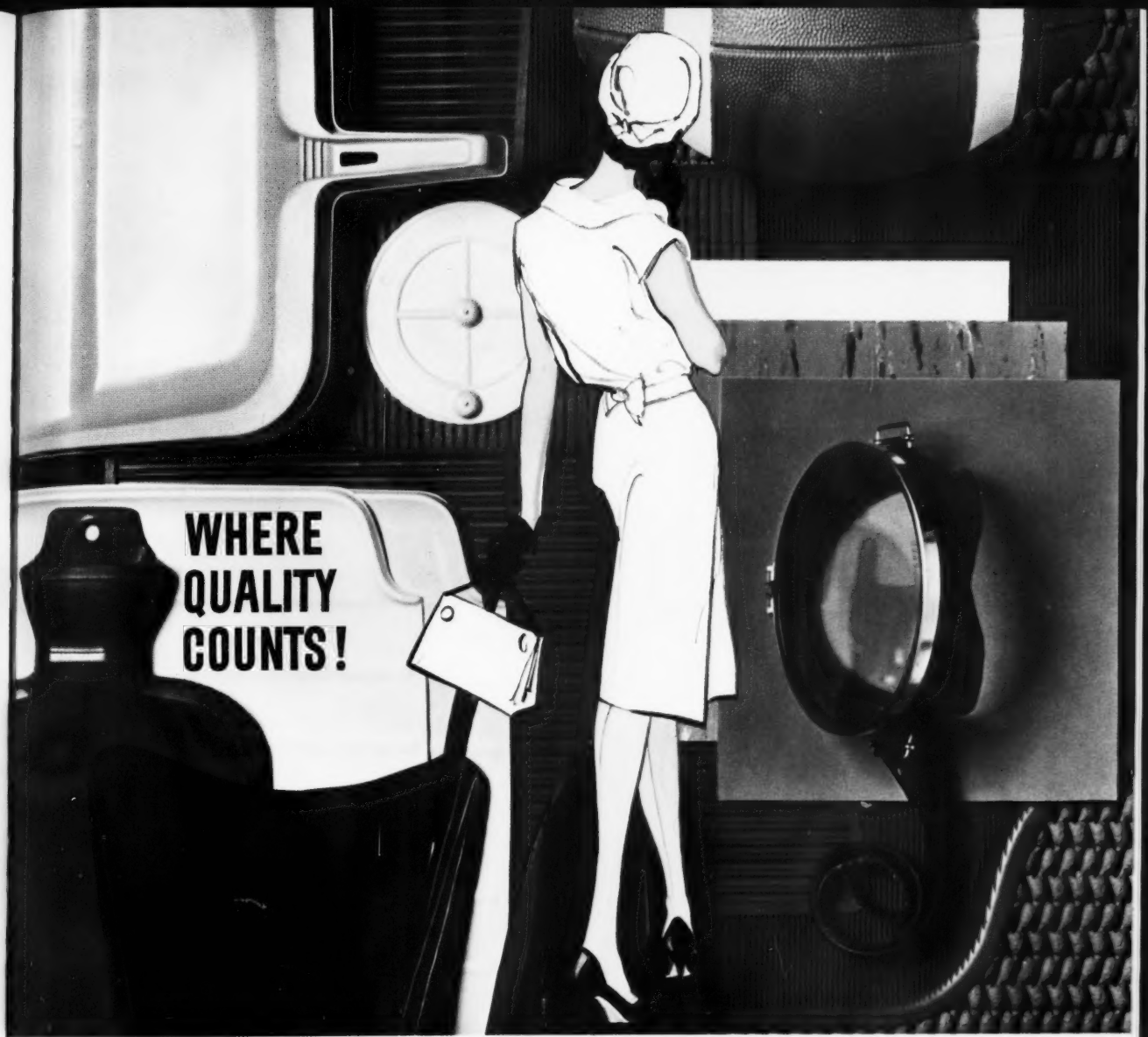
The systems, Movatron and Fixatron, are being marketed by Nationwide Traffic Engineering Products Corp., Glenside, Pa., and are being fabricated by the Stalwart Rubber Co., Bedford, O., which is using General Electric silicone rubber.

Giant Fabric Storage Tanks

Two 65,000-gallon-capacity rubberized fabric tanks are in production at Goodyear's Rockmart, Ga., plant for the Air Force.

The Air Force has acquired the tanks for the watchdog Distant Early Warning (DEW) Line, a chain of radar stations stretching from Alaska to Greenland.

These specially constructed tanks will provide drinking water for America's northernmost defense corps. Reliance on natural sources, such as shallow lakes, requires that the water be pumped from beneath the ice which often freezes eight feet deep and sometimes solid, making this process costly and quite inadequate.



GENERAL GENTRO®
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PROVIDES THE ANSWER TO
PRODUCT PERFECTION

Customer acceptance poses no problem when basic product ingredients are reliable. GENTRO NON-STAINING RUBBER brings into your plant the premium ingredients, uniformity of processing and ease of production to improve and maintain your product quality.

Let the many features of GENTRO NON-STAINING RUBBER — the exceptional consistency of GENTRO 1502 and GENTRO 1509, the low plasticity range (27 ± 2) of GENTRO 9103 (Low Mooney), or the excellent processing, oil-extended GENTRO 1778 — solve your end-product problems now.

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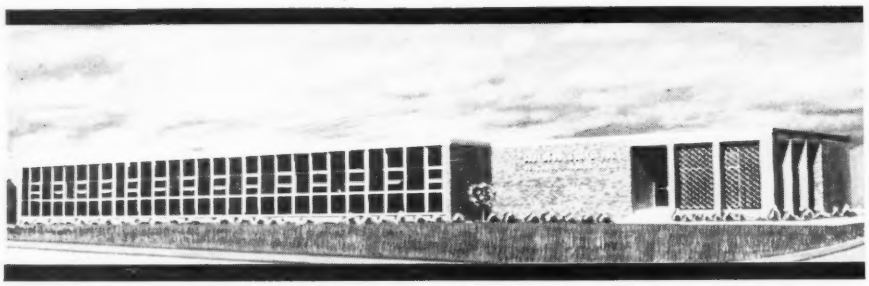
Chemicals for the rubber, paint, paper, textile, plastics and other industries: GENTRO SBR rubber • GENTRO-JET black masterbatch • GEN-FLO styrene-butadiene latices • GEN-TAC vinyl pyridine latex • GENTHANE polyurethane elastomer VYGEN PVC resins • KURE-BLEND TMTD masterbatch • KO-BLEND insoluble sulfur masterbatch

Creating Progress through Chemistry

Chemical Division GENERAL

OUR NEW RESEARCH LABORATORY



New research laboratory conveniently located at our plant in Gordon, Ga.

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Many of today's well-known kaolin clay products have been developed by Southern Clays' research. We were the first to give you Calcined Clays such as Pigment #33, #34 and Whitetex. As cross link polyethylene and ethylene propylene co-polymers were introduced, we gave you the non-black, reinforcing filler, Translink.

Now . . . one of the latest steps in our growth is the opening of a new research laboratory with the most modern facilities and equipment available. Our staff will be working on new clay developments as well as offering technical assistance to our many customers in the rubber field.

Do you have a problem with clays? One of our products could be the answer . . . but we must first know the problem. Submit inquiry to our Technical Service Department.

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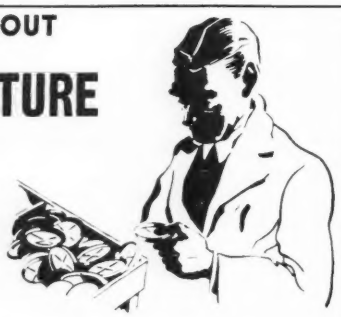
BE CAREFUL ABOUT

TEMPERATURE



REJECTS ARE A TOTAL LOSS!

There is very little you can do with scorched rubber except charge it off to experience. Even with the rapid modern accelerators, scorching is avoidable. With the Cambridge Surface Pyrometer, the operator can check, thus control the surface temperature of mill, warming and calender rolls. It is an accurate, rugged, quick-acting instrument, so easy to use that operators are glad to use it.

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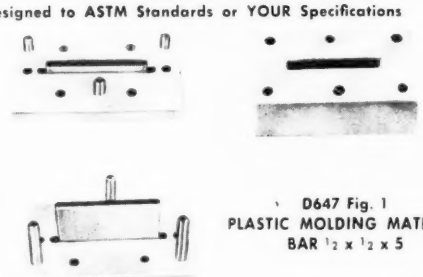
Designed to ASTM Standards or YOUR Specifications



D647 Fig. 1
PLASTIC MOLDING MATERIAL
BAR ½ x ½ x 5

ANOTHER HOGGSON MOLD

Designed for a Specific Need

The D647, Fig. 1, Plastic Molding Material, Bar ½ x ½ x 5 was designed to answer a specific problem. Hoggson engineers are known throughout the world for reputable service in supplying manufacturers of rubber, plastic and synthetic products with precision molds and dies for test samples or actual production. Send your requirements for Hoggson's suggestions. Ask for literature.

HOGGSON & PETTIS MFG. CO.

141 S. Brewery St., New Haven 7, Conn.
Pac. Coast: H. M. Royal, Inc., Downey, Calif.

Shell chemist removes CL-104 cushion from pin core mold. Read how this new latex can save you money.

SHELL ANNOUNCES A NEW SBR LATEX

Shell Chemical has developed an SBR latex that increases foam products yield as much as 15 per cent. Read about *new CL-104*—and how it can reduce your foam rubber costs. ➞

Shell's new CL-104 latex lets you reduce foam density as much as 15 per cent without sacrificing compression resistance

Shell Research has found a way to build greater strength into SBR latex. As a result, foam manufacturers can reduce the amount of rubber required in foam cushioning. Here's what this discovery can do for you.

SHELL CL-104 is a new SBR latex that can save you money. Here's why:

CL-104 is different from ordinary SBR latex. It's *stronger*. So much so, you can reduce the density of your present foam cushions as much as 15 per cent without losing compression resistance or tensile strength.

These facts are important to foam manufacturers. They mean *lower foam costs*. Because you can reduce foam density as much as 15 per cent, you use less rubber. Or, to look at it another way, with Shell CL-104 you can now make up to 15 per cent more cushions from every tank car of synthetic latex you buy.

Expands foam markets

Shell's CL-104 has dramatic possibilities of expanding your foam markets. In addition to lowering your foam costs, it now lets you offer the *comfort* advantages of *rubber latex foam* to consumers of lower-priced foam products.

No processing changes required

You may be wondering if your plant is set up to use Shell CL-104. Or if any elaborate processing changes are necessary.

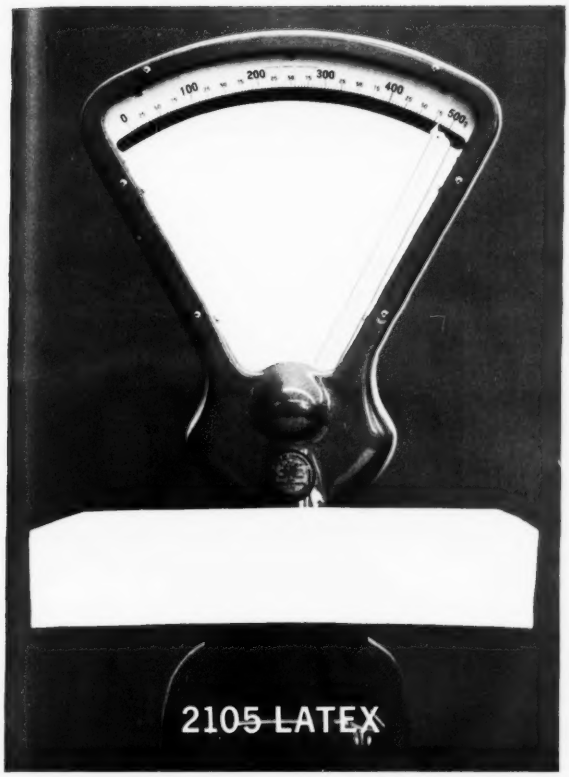
If you are presently using 2105 type latex, you can start using Shell CL-104 latex today. No special processing changes are needed.

Shell CL-104 froths readily, has equivalent gel time, vulcanizes and strips in the same manner as S-2105. It is compatible with natural latex and S-2105 in any ratio.

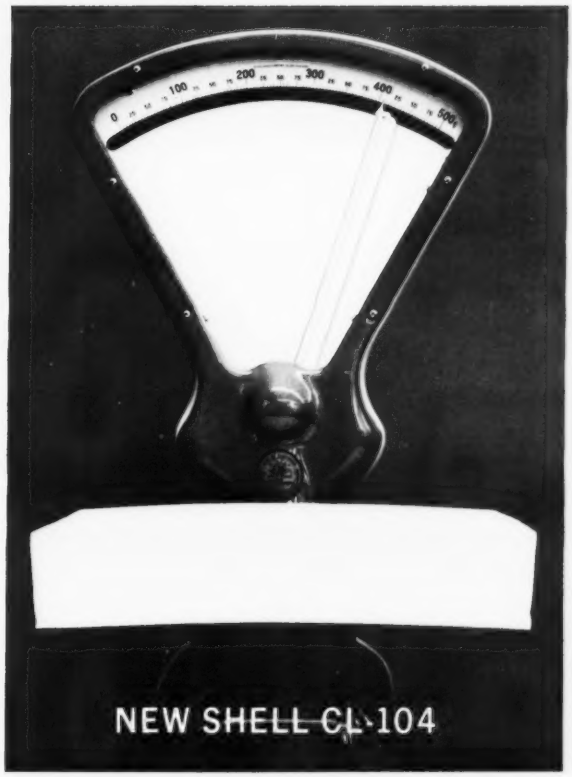
Handles easily

Hundreds of tests in Shell's Torrance laboratories during three years of research confirm its ease of handling in flat stock, standard cushions, and today's new pin core designs.

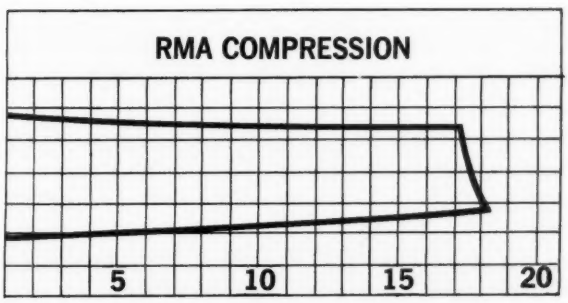
If you would like to try a test run of CL-104 in your own plant, contact your Shell representative. He'll help with all the details, and will show you how to start lowering your rubber latex foam costs.

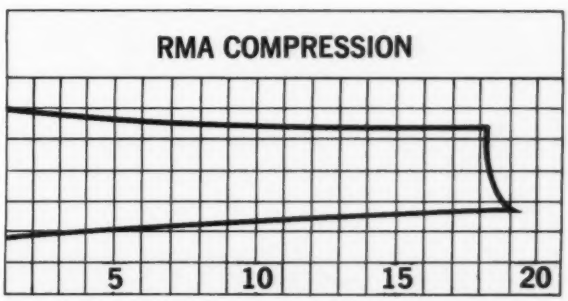


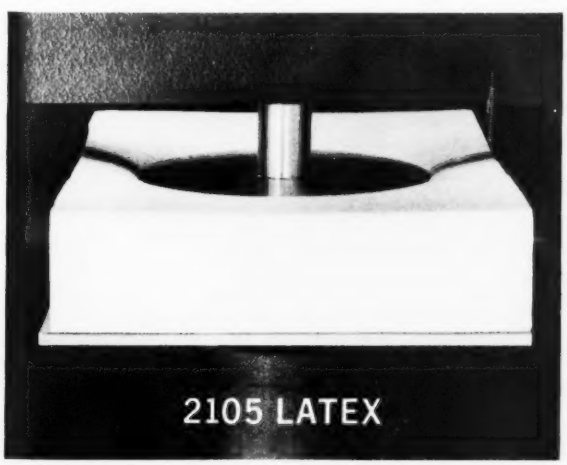
1. Photo above shows foam cushion made of standard 2105 latex. It weighs 480 grams. Photo below shows 2105 cushion registers RMA compression of 18 pounds at 25 per cent deflection.



2. Photo above shows same size cushion made of Shell CL-104. It weighs 405 grams—15 per cent less than the 2105 cushion. Photo below shows this lower density cushion has almost the same RMA compression.







SEE NEXT PAGE FOR PROPERTY CHART AND OTHER DATA ON SHELL CL-104 ⟶

NEW LATEX CONTD.

TYPICAL FOAM PROPERTIES OF NEW SHELL CL-104

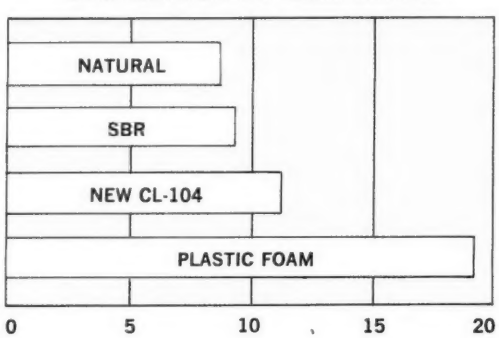
	CL-104	2105
Foam density, lb./cu. ft.	3.8	4.5
RMA compression, lb./50 in.²	18.0	17.5
Tensile Strength, psi	6.0	6.0
Elongation, %	170	200
Hot Wet Tensile Index, psi	3.2	3.0
Hot Wet Elongation, %	900	900
Compression Set, %	12.0	9.0
Volume Shrinkage	12.5	12.5
Flex Resistance, 250,000 cycles @ 77°F. Permanent Set, %	3.0	2.0
Change in RMA compression after flexing, %	−19	−15
Aging, 22 hours @ 212°F. Change in RMA compression, %	+15	+11

TEST FORMULA FOR SHELL CL-104

	PARTS DRY
CL-104	100.0
Sulfur	2.5
Zinc diethyldithiocarbamate	1.5
Zinc salt of 2-mercaptobenzothiazole	1.5
Antioxidant	1.0
Potassium oleate soap	1.0
Trimene Base*	0.75
Zinc oxide	3.5
Sodium silicofluoride	3.0

*Naugatuck Chemical Co.

COMPRESSION SET COMPARISON



Graph compares the compression set of Shell's CL-104 and three other foams after aging 22 hours at 158°F. The RMA maximum specification for foam cushioning is 20 per cent. Notice how CL-104 exhibits good compression set while giving higher compression resistance at a lower density.

How to get samples and technical data on new Shell CL-104

Samples of new CL-104 latex are now available for your evaluation. To receive samples and data, call your Shell Chemical representative, or write one of the three Shell Synthetic Rubber sales offices listed to the right.

SHELL SYNTHETIC RUBBER

P. O. Box 216, Torrance, California

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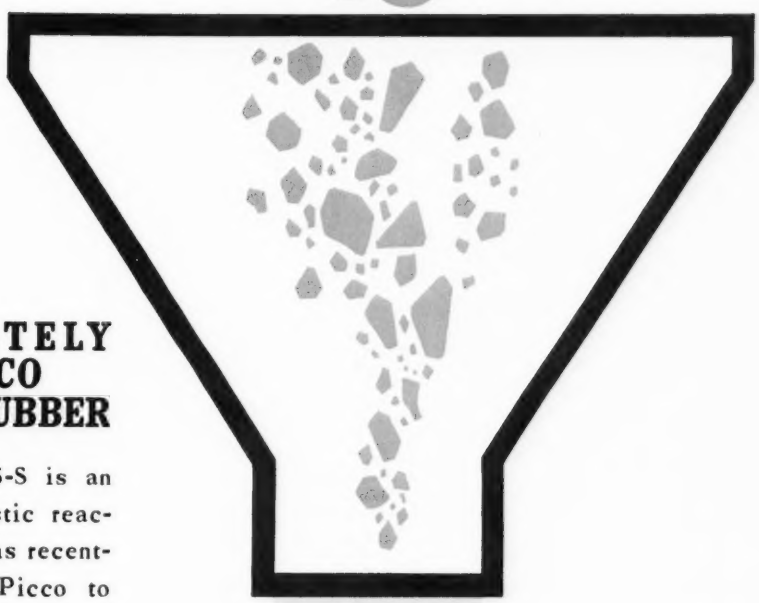
For lowest cost in light color compounds...

PICCODIENE 2215-S



A COMPLETELY NEW PICCO RESIN FOR RUBBER

PICCODIENE 2215-S is an olefinic thermoplastic reactive polymer. It was recently developed by Picco to provide better economy and greater efficiency in rubber product manufacturing.

PICCODIENE 2215-S OFFERS THESE ADVANTAGEOUS PROPERTIES:

LOWEST COST - Under thirteen cents per pound
HIGH SOFTENING POINT - 215 degrees Fahrenheit
LIGHT COLOR - Gardner 11
SPECIFIC GRAVITY - 1.11
LOW ACID NUMBER - 1 Max.
IODINE NUMBER - 180
REFRACTIVE INDEX AT 25 DEGREES CENTIGRADE - 1.56

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PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA

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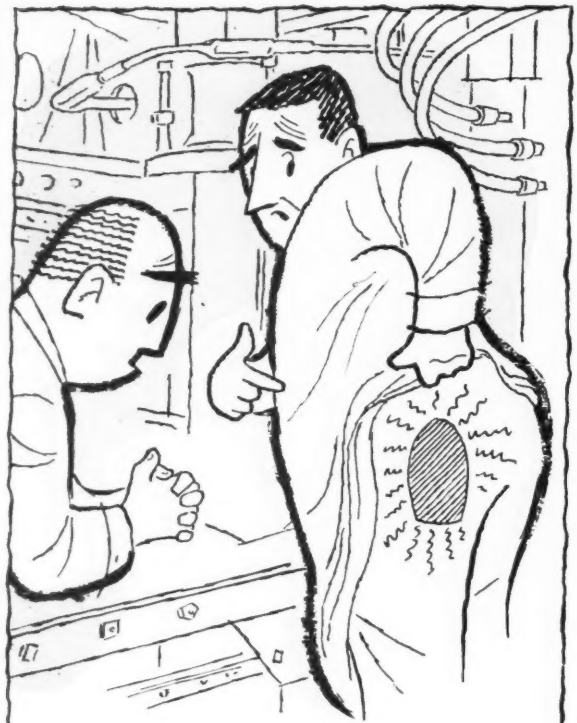

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Why risk neoprene scorch when you can get the best protection at low cost with MAGLITE D? It is the most effective of all magnesium oxides, providing optimum protection during mixing and subsequent processing with practical cure rates. MAGLITE D usually allows higher mixing speed and provides better uncured stock life, safer tubing at higher die temperatures, faster tubing and wire covering, and better molding characteristics. Find out how MAGLITE D can help solve your neoprene problems. Send now for samples and information.

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technical books

BOOK REVIEWS

"Polymeric Materials." By Charles C. Winding and Gordon D. Hiatt. McGraw-Hill Book Co., New York, N. Y. Cloth bound, 9½ x 6¼ inches. Illustrated, 416 pages.

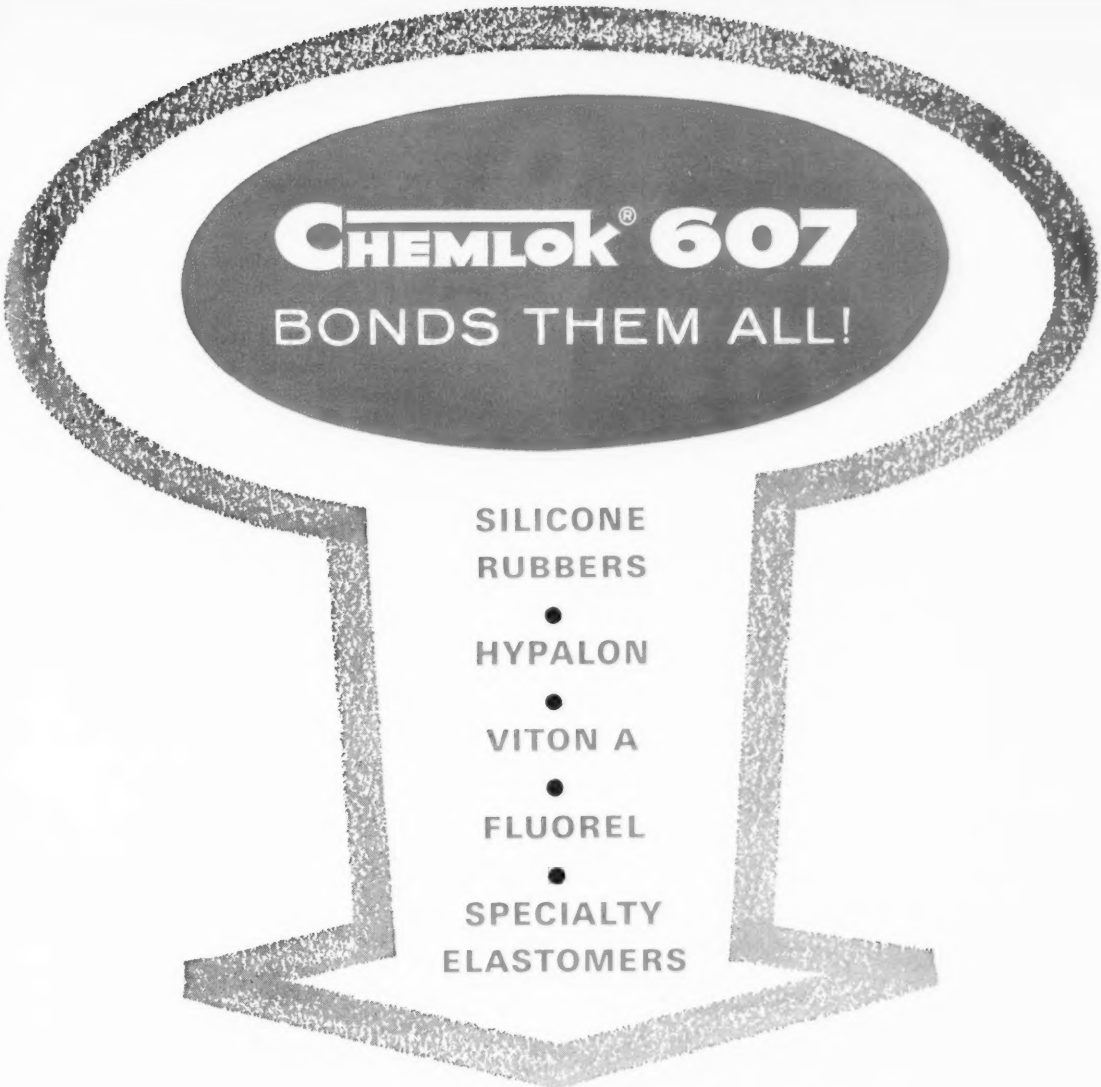
This new volume provides a valuable introduction to the general field of polymers for the general reader with some background in chemistry or engineering. It is not a text on either the physics or chemistry of high polymers. Rather, it covers the chemistry, polymerization, processing and applications of fibers, films, coatings, adhesives, molded and extruded plastics, and rubbers.

Chapters on polymer structure and polymerization reactions, polymer testing, and general properties of plastics, are followed by two chapters on applications and processing of plastics, and four chapters describing the chemistry and polymerization of each of the natural and synthetic polymers. Chapters cover fossil and plant resins, cellulose derivatives, rubber derivatives, proteins, condensation polymers, ethenic polymers, silicones, and rubbers.

The book is, as its title implies, no more than an introduction. It is not aimed at the polymer chemist, nor is it a source of detailed information on rubber or any particular plastic. Considerable material is already available which will supply this material. However, persons in the rubber industry who wish a general picture of the plastics field will find "Polymeric Materials" quite helpful. The graphs, pictures, flow sheets, and drawings of equipment are clear and easy to understand; the plan of organization is sensible, and the bibliography is quite extensive. The chapter on polymer chemistry is also quite helpful for the beginner in the field.

"Silicones." S. Fordham. Cloth, 5½ x 9 inches, 260 pages. Philosophical Library, Inc., New York, N. Y. Price, $10.

This latest book on the silicones is designed to give the polymer chemist a general background of silicone chemistry and polymerization, with just enough information on properties and applications to enable him to judge potential applications for any new or modified uses. About a third of the book is devoted to the various types of silicone reactions, another 30-odd pages to the chemical structure and properties of polysiloxanes, a short section on world silicone production and markets, a slightly longer one on manufacture of silicone fluids, resins and gums,



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and the final 100 pages on properties and applications of silicone fluids, molding resins, coatings, and rubbers.

The growing complexity of the silicone field is indicated by the fact that separate sections of the book were written by specialists in the fields of silicone chemistry, manufacture, and processing and applications in the fields of rubbers, fluids, resins, water repellents, textile coatings, leather coatings, polishes and electrical uses, all of them members of the Nobel Division of Imperial Chemical Industries, Ltd. Dr. Fordham, a member of the Nobel Division's research and development department, edited and modified the separate sections to unify them into a whole.

On the whole, the complex subject of silicone chemistry is handled with sufficient completeness for the non-specialist, but rapid developments in the field have somewhat outdated the sections on properties and applications. There is no mention, for example, of room-temperature vulcanizing rubbers, or of the recent practice of marketing reinforced gums for particular applications.

NEW PUBLICATIONS

"A New Tracerlab Automatic Process Control Installation." Tracelab, Inc., Waltham, Mass. 8 pages. The brochure describes the installation of the company's beta gage system for the Textileather Division of The General Tire & Rubber Co.

"Piccopale Hydrocarbon Resin Emulsions." Pennsylvania Industrial Chemical Corp., Clairton, Pa. 12 pages. The brochure contains detailed information on nine emulsions designed for film waterproofing applications.

"Enjay Butyl, the Versatile Rubber for Modern Building Design." Enjay Chemical Co., New York, N. Y. 8 pages. The booklet deals with properties and typical applications.

"Tinius Olsen Testing Machines." Bulletin 59-A. Tinius Olsen Testing Maehine Co., Willow Grove, Pa. 34 pages. This bulletin lists the complete Tinius Olsen line of physical testing machines for rubber and plastics. Each item is pictured along with a description of its function and ASTM test designation where applicable. In addition to new, split cabinet Electromatic universal testing machines, the bulletin features special equipment for testing plastics flow, heat distortion, stiffness, brittleness, impact, creep, wear, deformation, folding endurance, hardness, and compression set. Specifications on recorder, program control, and strain instrumentation are included as well as testing tools and accessories.

Publications ot The Natural Rubber Producers Research Association, Welwyn, Garden City, Herts, England:

No. 374. **"Polymerization of Vinyl Monomers in Rubber Latexes."** By P. W. Allen, C. L. M. Bell, and E. G. Cockbain. 14 pages.

No. 375. **"Recent Developments in Superior Processing Natural Rubber."** By H. C. Baker and R. M. Foden. 20 pages.

No. 376. **"The Role of Hysteresis in Tire Wear and Laboratory Abrasion."** By A. Schallamach. 16 pages.

No. 377. **"The Block Copolymerization of Methyl Methacrylate and Acrylonitrile.** Part I, Mechanico-Chemical Synthesis; Part II, Characterization and Structure," By R. J. Ceresa. 24 pages.

No. 378. **"A Modified Helical Spring Stress Relaxometer for Automatic and Manual Operation."** By J. R. Dunn and J. Scanlan. 8 pages.

No. 379. **"The Oxidative Aging in Ultra-Violet Light of Dicumyl Peroxide Vulcanizates of Natural Rubber in Presence of Various Antioxidants."** By J. R. Dunn. 12 pages.

No. 380. **"Light-Scattering Measurements on Solutions of Natural and Synthetic Polyisoprenes."** By P. W. Allen and G. M. Bristow. 10 pages.

No. 381. **"The Strain Dependence of Rubber Viscoelasticity.** Part II, The Influence of Carbon Black." By P. Mason. 12 pages.

No. 382. **"Viscosity and Plasticity of Concentrated Rubber Solutions."** By G. M. Bristow. 8 pages.

No. 383. **"Low Ammonia Latices."** By G. F. Bloomfield and R. B. Mumford. 16 pages.

Publications of Manufacturing Chemists' Association, Inc., Washington, D. C.:

"Properties and Essential Information for Safe Handling and Use of Methyl Ethyl Ketone." Safety Data Sheet SD-83.

"Entering Tanks and Other Enclosed Spaces." 8 pages. The publication, tenth in the Association's Safety Guide series, emphasizes that hazards inherent in tank entry can be avoided or overcome by following three prescribed basic principles. Common hazards are listed, and procedures and precautions are presented in good detail.

"Cenco J-300 General Catalog." Central Scientific Co., Chicago, Ill. 1008 pages. This catalog covers the complete line of Cenco instruments and equipment.

"Manual for the Preparation of Subfloors for the Installation of Rubber and Solid Vinyl Flooring." Rubber & Vinyl Flooring Council, The Rubber Manufacturers Association, Inc., New York, N. Y. 6 pages.

"Hannifin Air Power Presses." Hannifin Co., Des Plaines, Ill. 8 pages. Bulletin 0960-Bl includes dimensions and technical information for all open gap and column Hannifin air presses.

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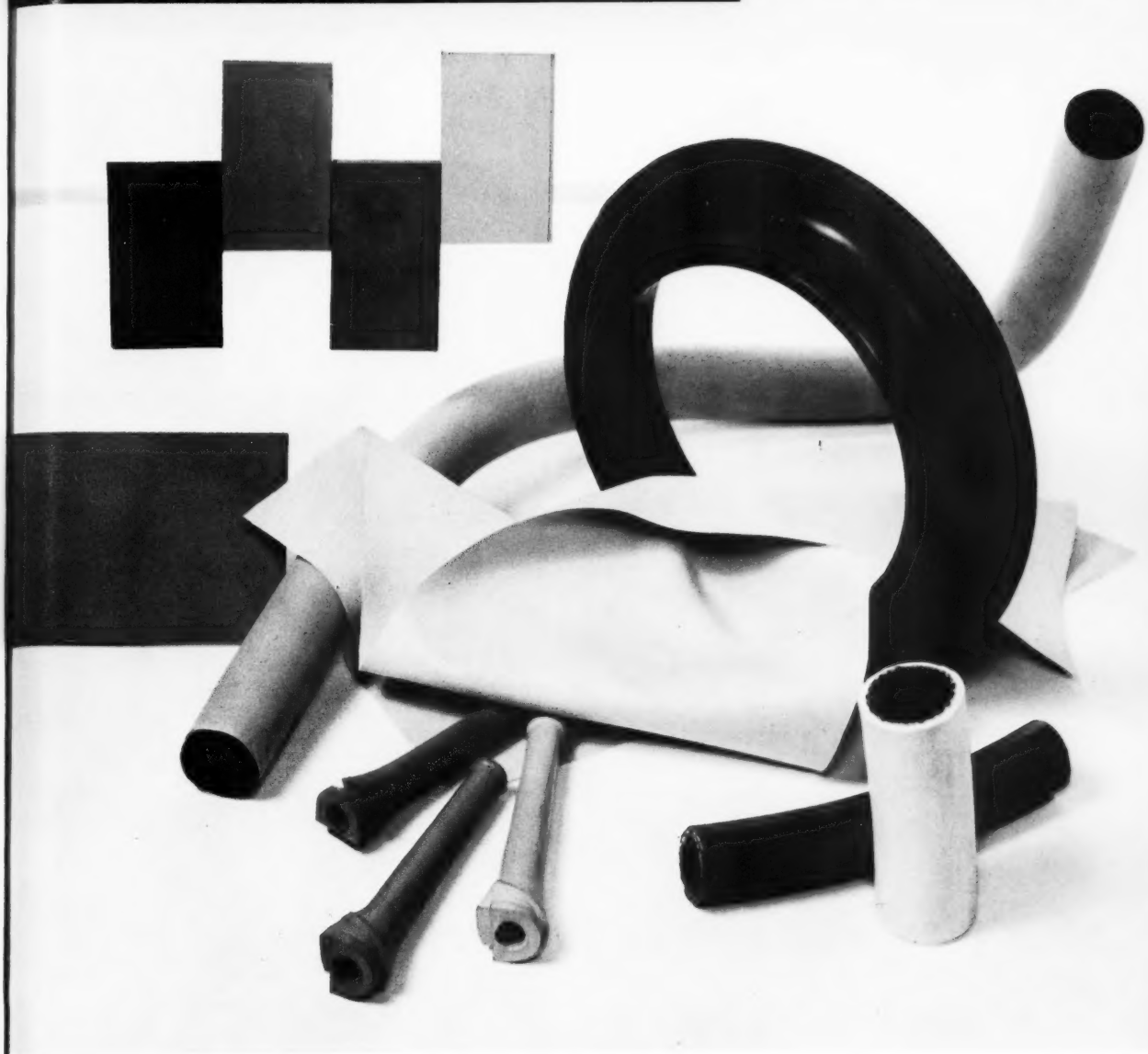

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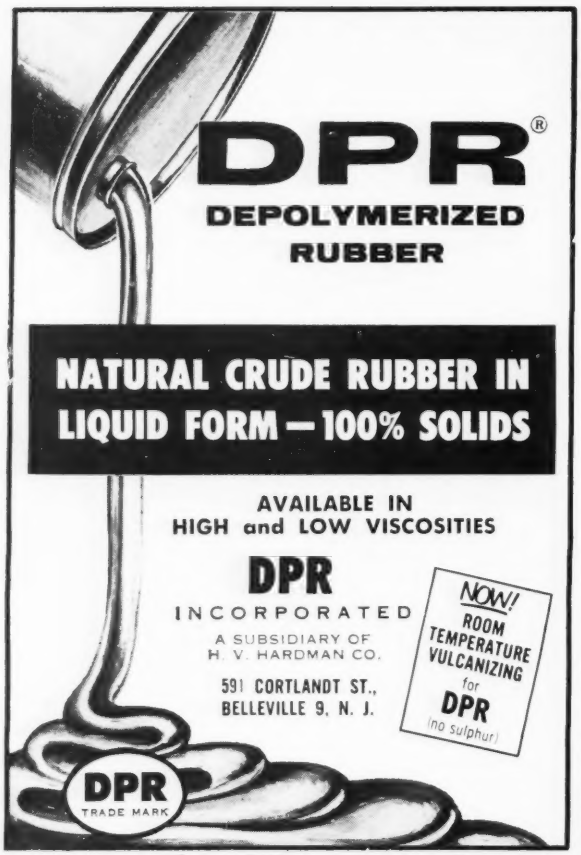

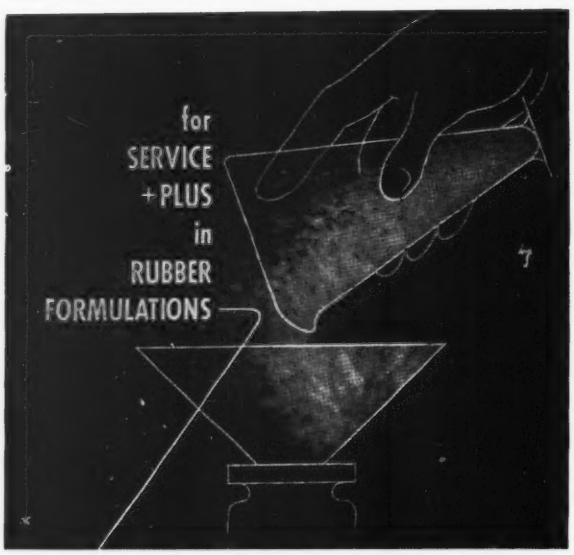

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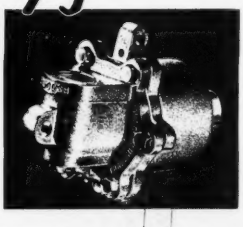

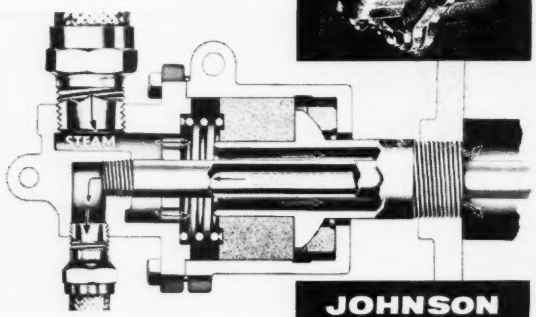

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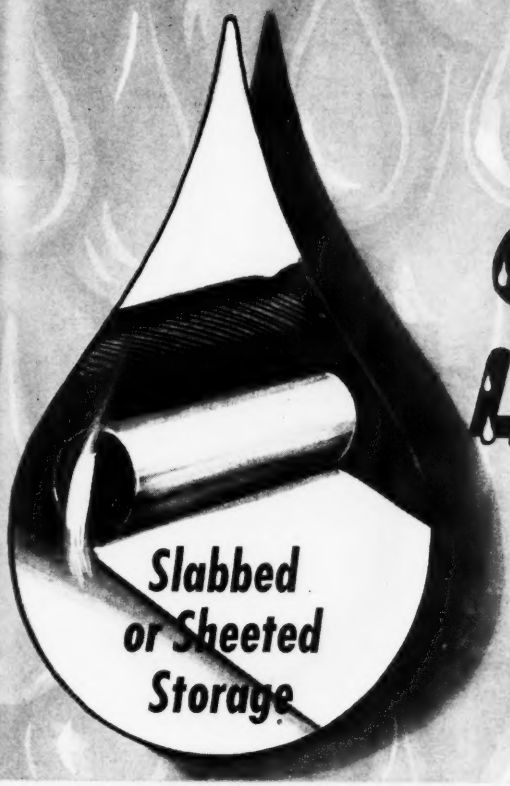

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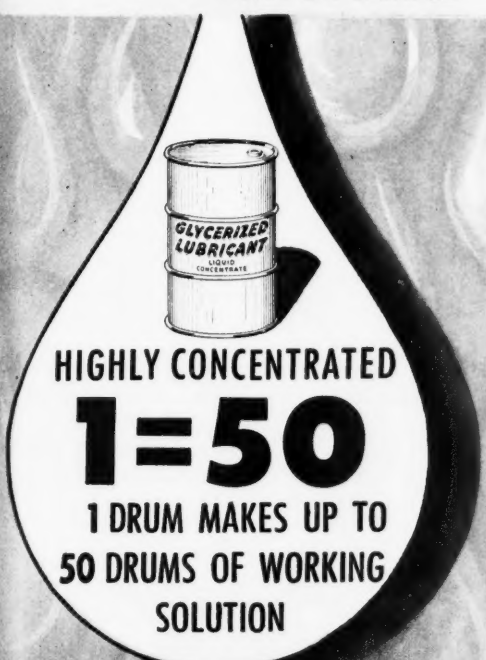

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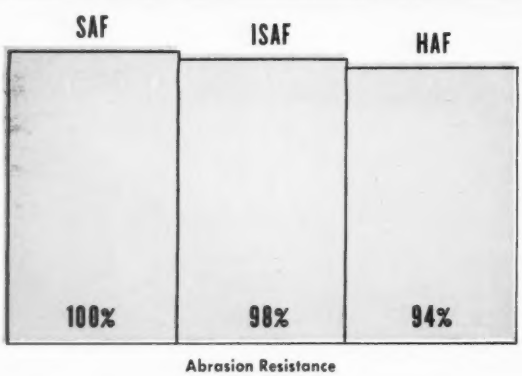

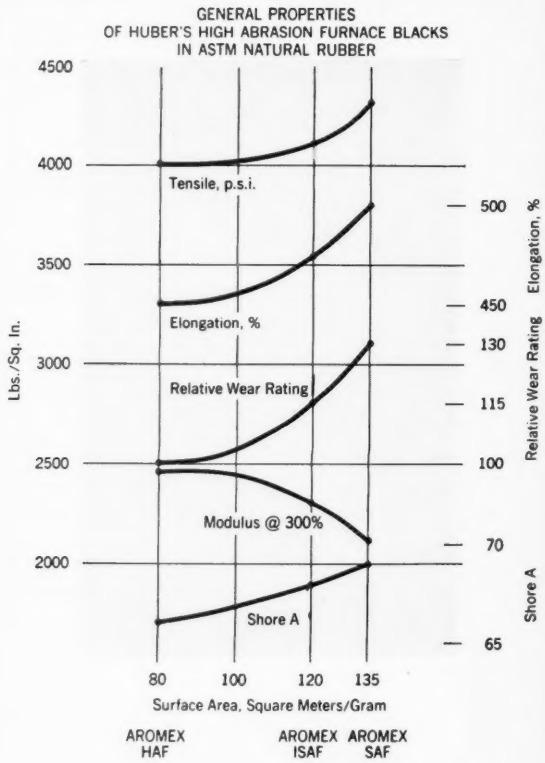

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A Great Flow of New Materials... Are We Making Good Use of Them?

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Development and testing costs are high, as we are all very painfully aware, but there is still much evidence that some evaluation plans are weak and antiquated. It is quite easy to fall into the habit of trying to match a new material to a problem at hand. While there is no objection to trying to solve such problems, an initial evaluation sample should be used in a well-planned series of tests to produce a maximum of information on the use and properties of this material.

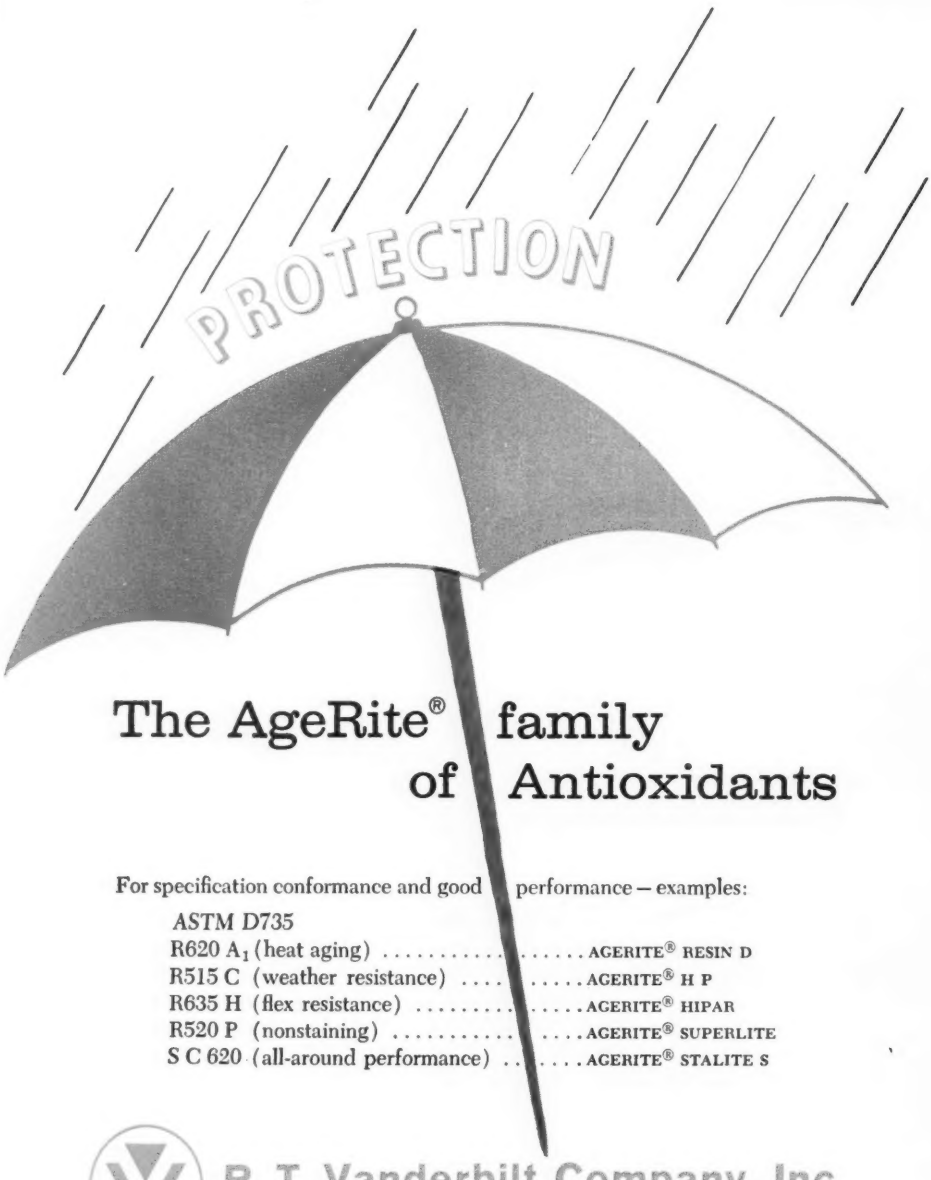
The decision on the part of management to pass a promising research product onto development and ultimately to market is very difficult and full of pitfalls. As with horses, past form and potential may suggest a favorite, but the dark horse may win the race. We must gain the greatest amount of good information at the least cost to make the art of market evaluation as much a science as possible.

Once we have committed a material to commercial production, what then? The first step is to make the best possible use of the material in existing products. A vital need in this direction, for the benefit of our many overworked compounders, is successful dissemination of basic information. Our still lax systems of identification and classification make it difficult to know just where and how to find information on the product and related materials. PBD, for instance, turns up often in the literature and bulletins when ASTM offers us the use of BR for the same polybutadiene rubber. EPR is often described as a stereo specific polymer, but it is not.

Finally, can we find more NEW USES to expand our total field?

R. S. Walker

EDITOR



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Compounding *Cis*-Polybutadiene For Pneumatic Tire Applications

Used in 50/50 blends with natural rubber or SBR, *cis*-polybutadiene can reduce operating temperatures of carcass compounds and greatly increase abrasion resistance of tread stocks. Compounding requirements, however, are rather different from those of NR or SBR, as shown in this article by four members of Goodyear Tire & Rubber Co.'s development department.

COMPOUNDING *CIS*–POLYBUTADIENE[1]

By R. J. BROWN, R. B. KNILL, J. F. KERSCHER, and R. V. TODD
Goodyear Tire & Rubber Co., Akron, O.

CIS 1,4 POLYBUTADIENE is proving to be one of the most versatile compounding materials available to the tire compounder. It has characteristics as a polymer which make it acceptable as a replacement for either natural or synthetic rubber in tire applications.

Laboratory studies, confirmed by more than three million miles of tire testing, have shown that in either passenger or truck tires the carcass durability can be substantially improved, operating temperature lowered, low-temperature performance improved, and treadwear resistance increased when *cis*-BR is properly used in the respective tire components.

In considering *cis*-polybutadiene for tire applications, one can describe it in a variety of ways:

- As a compounding ingredient—since it must be used in conjunction with other conventional polymers on account of its poor processability.
- As a natural rubber replacement—when used in compounds where high resilience and low heat buildup are desirable.
- As an SBR replacement—when abrasion resistance is the prime requisite.

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CIS-POLYBUTADIENE

High sulfur for high resilience in carcass compounds

Low sulfur for good abrasion resistance and high tensile in tread stocks

High levels of petroleum based oils for improved processability and performance

ISAF black for the ultimate in abrasion resistance

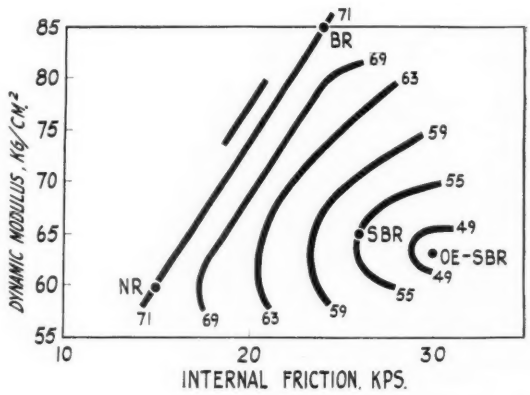

Fig. 1. Resilience characteristics of natural rubber, *cis*-polybutadiene, SBR, and oil-extended SBR are plotted against their dynamic moduli and internal friction. Resilience of SBR blends with the other polymers are shown by going up the resilience curves. The line to the left of 71% resilience shows resilience of a blend of natural rubber and BR in a high sulfur test formula

In general, all of the polybutadienes, regardless of *cis* content, show similar polymer characteristics in that they are soft, putty-like rubbers with very little green strength or tack. When compounded, they all exhibit similar sensitivity to compounding ingredients and are characterized by high resilience and good abrasion resistance.

Three basic types of polybutadiene are currently being considered for tire applications:

1. The very high *cis* polymer—approximately 95% *cis*.

2. The very low *cis* polymer—approximately 40% *cis*.

3. The relatively high *cis* polymers—approximately 90-95% *cis*.

Goodyear's Budene 500 and Phillips' Cis-4 are examples of the third type. Data, results, and conclusions offered here will be based on the Budene 500 type, but studies have shown that the principles developed generally apply to all the polybutadienes and may serve as a starting point for evaluation of any particular polymer selected.

Properties of *Cis*-BR Vulcanizates

In modulus/tensile values, BR is more nearly com-

[1] Based on a paper presented before the Division of Rubber Chemistry, ACS, Chicago, Ill., Sept., 1961.

parable to SBR than to natural rubber. The following table compares physical test values of natural, *cis*-polybutadiene, and SBR rubbers, using a test formula containing 50 phr. ISAF carbon black, and oil-extended SBR using 68 phr. ISAF black to compensate for polymer oil.

	NR	BR	SBR	OE-SBR
300% Modulus, psi.	1700	950	850	825
Ultimate tensile, psi.	4050	2800	3600	3100
R. T. rebound, %*	71.2	71.2	55.0	47.4

* Goodyear-Healy rebound, ASTM D 1054.

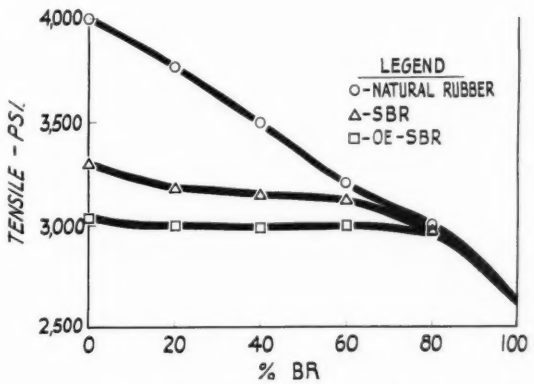

Fig. 2. Effect of *cis*-polybutadiene on ultimate tensile strength in blends with natural rubber, SBR, and oil-extended SBR

Under dynamic test conditions BR was discovered to be a distinctly different polymer. While BR exhibits a relatively low modulus at low rates of deformation, its resistance to high-speed (dynamic) deformation[2] is extremely high in comparison with NR or SBR. It is this unique characteristic which makes it possible for a material with an internal friction comparable to that of SBR to exhibit resilience properties equivalent to those of natural rubber, as the following table shows. Test formulas are the same as in the preceding table:

	NR	BR	SBR	OE-SBR
Modulus, static psi.	1700	950	850	825
Dynamic, kg./cm.²	59.4	85.0	65.0	63.0
Resilience, static, %	71.2	71.2	55.0	47.4
Dynamic, %	53.7	53.0	43.5	32.1
Internal friction, kps.	15.1	24.3	26.1	30.0

This relation is perhaps clearer when the resilience characteristics of the three polymers are plotted[3] against their dynamic moduli and internal frictions (Figure 1). Natural rubber is characterized by a low dynamic modulus and internal friction. SBR exhibits a relatively low dynamic modulus, but a decidedly higher internal friction than natural rubber. BR, while having an internal friction equivalent to that of SBR, has dynamic modulus properties at least half again as high as either of the conventional polymers.

If lines of equal rebound for the blends of these polymers are drawn on the graphs, it may be seen that the deadening effect of an increase in internal friction may be offset by a sufficiently large increase in dynamic modulus.

Therefore:

Polybutadiene may be used as a compounding ingredient to extend natural rubber with no loss in resilience.

(This is shown by following the line of constant rebound between NR and BR.)

It may be blended with SBR to improve resilience.

(This is shown by crossing the successively higher lines of rebound as you go from SBR to BR.)

Blends with NR and SBR

Practical commercial formulations generally require blending of conventional polymers with BR to achieve good processability in existing factory equipment.

The BR ratio for the most satisfactory plant processing is in the range of 50%.

Special techniques, however, were used to prepare tire treads with higher proportions of BR in a 50-phr. ISAF test formula. Such compounds are not easily handled in the factory, but they provide the fundamental information necessary if BR is to be used to best advantage in practical formulations.

Laboratory physical tests showed that tensile and rebound values for any particular blend fell in a range between the respective properties of the polymers used in the blend (Figures 2 and 3).

The results of tire tests were more unexpected. Treadwear measurements revealed approximately 1% im-

CIS-POLYBUTADIENE BENEFITS

The use of cis-BR as an NR replacement in carcass compounds reduces the tire operating temperature and improves carcass durability or separation resistance

BR as a polymer replacement in a tread compound improves treadwear resistance, reduces running temperature, and improves cold weather performance

[2] "Dynamic Modulus and Hysteresis Vibrator," S. D. Gehman, D. E. Woodford, R. S. Stambaugh, *Ind. Eng. Chem.*, 33, 1032 (1941).

[3] P. F. Bertsch, RUBBER WORLD, 144, 3, 75 (1961).

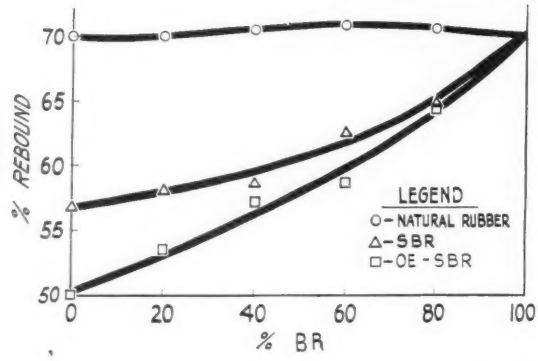

Fig. 3. Effect of BR on rebound at 75° F. in blends with other rubbers

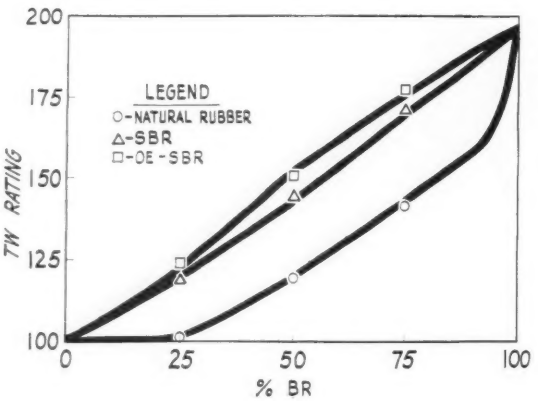

Fig. 4. The marked increase in treadwear obtainable by using blends of BR with other rubbers is indicated

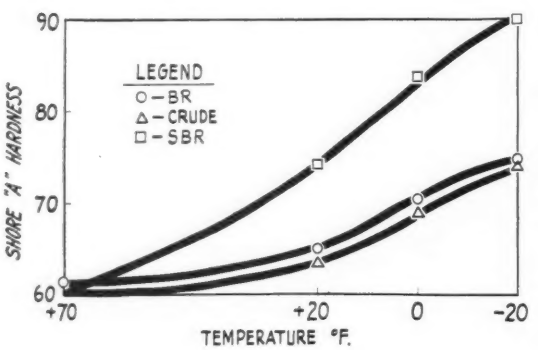

Fig. 5. Improved traction of BR blends on ice or snow is indicated by the relative insensitivity of BR to temperature drops, shown here

provement in treadwear for each percentage of BR used in a blend with SBR or OE-SBR. Blends with natural rubber were not particularly outstanding for abrasion resistance until the percentage of BR exceeded 50% (Figure 4).

Tire testing during winter revealed that because of *cis*-polybutadiene's relative insensitivity to temperature

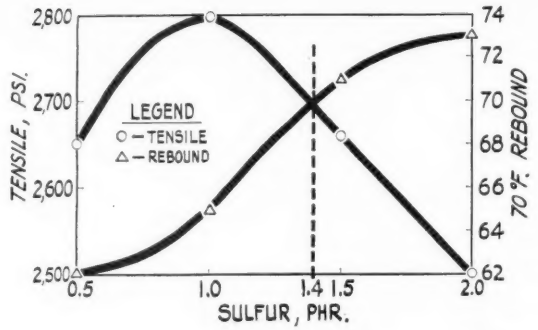

Fig. 6. High levels of sulfur in a 100% *cis*-polybutadiene test formula decrease tensile strength and increase resilience, as indicated. The dotted line shows the optimum sulfur level

change, tread compounds of BR/SBR blends remained relatively softer than 100% SBR stocks. (Figure 5 compares temperature effects on SBR, BR, and NR.) As a result, they gave up to 16% improved traction on ice and 7% improved traction on snow, as the following table shows.

	Ice		Snow	
	Traction	Stopping	Traction	Stopping
100% SBR	100	100	100	100
80% SBR/20% BR	106	103	104	101
50% SBR/50% BR	116	111	107	105

Compounding Studies

With proper acceleration, it was discovered, BR not only requires less sulfur than SBR or NR to establish a tight cure, but is also more sensitive to variations in sulfur level.

As the sulfur level is increased, there is a rise in tensile and resilience values through the 1.0-phr. level. Thereafter the tensile peaks very sharply and falls rapidly with an increase in sulfur. Resilience, however, continues to increase rapidly through the 2.0-phr. level. The maximum tensile/rebound balance is obtained at about the 1.4-phr. level (Figure 6).

When sulfur level variation was evaluated in a 50% BR/50% SBR blend, it was apparent that the ultimate in treadwear resistance was obtained at a relatively low sulfur level (Figure 7). In reducing sulfur level in blends of BR and conventional polymers for optimum wear advantage in tread compounds, there must be a compensating increase in acceleration so that the time/temperature relation of the cure is maintained.

Treads from BR/NR blends, however, are susceptible to chipping and chunking under adverse road conditions. It is theorized that the basic sulfur requirements of the two polymers are sufficiently far apart so that a suitable adjustment has not been found except where the BR is severely overcured or the NR portion of the blend undercured.

In carcass stocks, on the other hand, this diverse sulfur requirement of the two polymers can be an

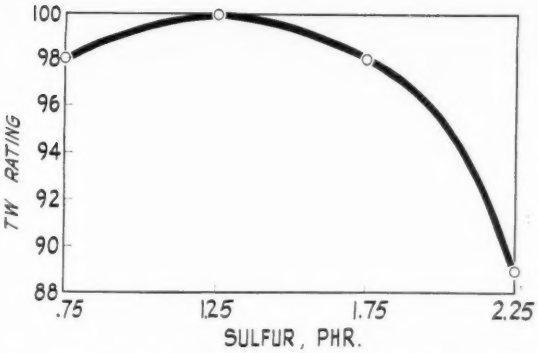

Fig. 7. High levels of sulfur in a 50% BR/50% SBR tread stock cut treadwear markedly

advantage. The high sulfur levels required for natural rubber are maintained in the blend. This high sulfur develops a resilience in polybutadiene which actually exceeds that of natural rubber.

The higher resilience contributed by the *cis*-BR portion of the blend results in a carcass compound which provides cooler operating temperatures. In addition, the superior age resistance of the synthetic polymer is carried over into the blend, making it more resistant to whatever heat is generated.

Plasticizers

While 50/50 blends of BR with NR or SBR will band on factory mills and follow a continuous strip feed satisfactorily, their processing temperatures are excessive. By adding processing oils to the blends, excessive heat generation can be overcome.

The following table describes the effect of added oil level of a tubing temperature of BR and OE-SBR in a tread compound when the carbon black level is held constant. Amounts of oil listed are in addition to the polymer-contained oil in the OE-SBR polymer.

	Oil, phr.	Temperature
OE-SBR control	—	275° F.
BR/OE-SBR blend	0	290° F.
BR/OE-SBR blend	10	280° F.
BR/OE-SBR blend	20	260° F.

TABLE 1. EFFECT OF ADDED OIL ON PROPERTIES OF TREAD-TYPE COMPOUNDS*

	NR	OE/SBR	BR/OE-SBR†
Tensile strength, psi.			
0 phr. oil	4200	4000	2800
10 phr. oil	4025	3200	2800
20 phr. oil	3425	2825	2675
% Rebound, 200° F.			
0 phr. oil	78.2	66.2	68.3
10 phr. oil	78.8	64.0	71.2
20 phr. oil	78.8	62.5	71.4

* Added oil is in addition to the polymer contained oil in the OE-SBR polymer.
† 50/50 blend.

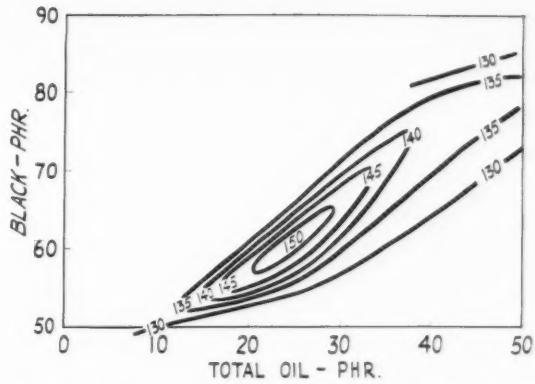

Fig. 8. Treadwear curves show relation of black and oil levels to treadwear in 50% BR/50% SBR blend

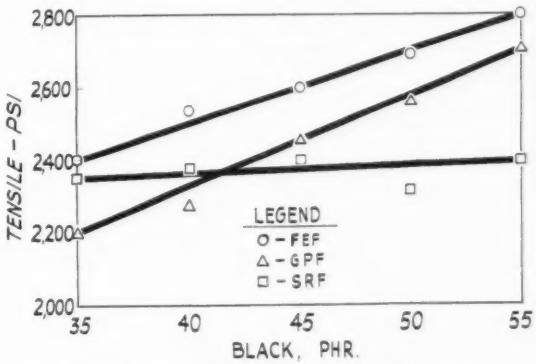

Fig. 9. Effect of loadings of three different carcass blacks on tensile strength of 50% BR/50% SBR blends is indicated here. FEF black appears superior at these loadings

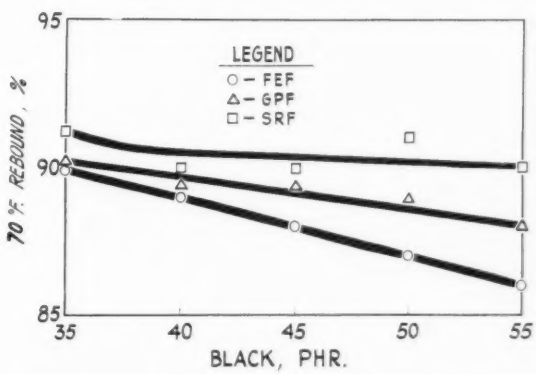

Fig. 10. FEF black, which appeared superior to two other carcass blacks in improving tensile strength of a 50% BR/50% SBR blend, ranks last in rebound, at loading levels shown

Unlike SBR or NR, physicals of the 50/50 BR blend with SBR maintain their original property levels when oil is added with no black adjustment. In addition, rebound of the blend is actually improved by addition of oil (Table 1).

R. J. Brown

R. B. Knill

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The Authors

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R. V. Todd, staff development engineer, was graduated from the University of New Hampshire with a B.S. in chemical engineering. He joined Goodyear in 1953 as a trainee, became junior engineer in the development department, and attained his present position in 1958.

J. F. Kerscher, section head, chemical materials development, received a B.S. in chemical engineering from the University of Wisconsin. He became associated with Goodyear in 1937 and has been engaged in research and development work, first with industrial products and later with chemical materials.

These improvements, however, are obtained with petroleum-based oils. Even at the 10-phr. level, naval stores depress the tensile values and seriously dampen rebound values even after acceleration adjustments have been made to account for retarding effect. The following table compares the effect of several plasticizers on tensile and rebound properties of a 100% BR test formula which contains 50 phr. ISAF. Plasticizer levels are 10 phr.

	Petroleum Oils		Naval Stores	
	Aromatic	Naphthenic	Pine Tar	Rosin Acid
Tensile, psi.	2700	2600	2500	2500
R. T. rebound, %	71.8	73.5	66.2	65.2

In addition to the low rebound, which would produce running temperatures that could not be tolerated in either tread or carcass, naval stores plasticizers give no real processing advantage. Further, they seriously detract from the inherent abrasion resistance of *cis*-polybutadiene, as shown by the treadwear ratings of a 100% BR tread formula with 50 phr. of ISAF black, one plasticized with 10 phr. medium process oil, the other with 10 phr. pine tar.

Plasticizer	Rating
Medium process oil	100
Pine tar	50

In BR, as in SBR and NR, compounding with high levels of oil makes an increase in black advisable. Figure 8 shows the relation between tread wear and oil/-black levels.

For treadwear, BR shows a preference for ISAF black, as shown by the following table, giving treadwear rating of stocks based on 50/50 BR/SBR and 50/50 BR/NR, each containing 50 phr. of black.

	Rating	
	BR/SBR	BR/NR
ISAF	100	100
HAF	70	70

For carcass stock, no preference is shown for any of the three most commonly used blacks: SRF, GPF, or FEF (Figures 9 and 10).

Typical Tire Formulations

Table 2 shows a typical formula for blends of BR and OE-SBR, and blends of BR and NR in tread stocks. A convenient way to incorporate oil in a blend is through use of the oil-extended SBR, which adds a total of 18.75 parts oil per 100 rubber hydrocarbon in the blend.

Table 3 shows typical carcass formulations containing 50% BR and 50% NR.

TABLE 2. TYPICAL TREAD FORMULATIONS CONTAINING 50% BR BLENDS

	BR/NR	BR/OE-SBR
RSS	50.00	—
OE-SBR	—	68.75
Budene 500	50.00	50.00
ISAF carbon black	50.00	60.00
Medium process oil	10.00	—
Wingstay 100*	1.00	2.00
Paraffin wax	—	2.00
Stearic acid	2.00	2.00
MBTS	—	0.70
DPG	—	0.70
Amax #1†	0.50	—
Zinc oxide	3.00	3.00
Sulfur	2.00	1.75
	168.50	190.90
Specific gravity	1.105	1.136
Optimum cure @ 275° F., min.	70	40

* Mixture of diaryl-p-phenylene diamines, Goodyear chemical division.

† N-oxydiethylene benzothiazole-2-sulfenamide, plus a percentage of benzothiazyldisulfide, R. T. Vanderbilt Co., New York, N. Y.

The following table shows the improvement of running temperatures for a 50/50 NR/BR blend as compared with NR in laboratory dynamometer tests.

100% NR	50/50 Blend
233° F.	227° F.

The following table shows the results of tests made on a cleated wheel dynamometer[5] with 100% natural rubber and a 50/50 blend of NR and SBR. Figures are in miles to failure.

Carcass	100% NR	50/50 Blend
Truck	4,539	5,269
Passenger	5,284	7,520

TABLE 3. TYPICAL CARCASS FORMULATIONS CONTAINING 50% BR/50% NR

	Truck Carcass	Passenger Carcass
RSS	25.00	25.00
Crepe	25.00	25.00
Budene 500	50.00	50.00
FEF carbon black	40.00	35.00
Medium process oil	8.00	8.00
Rosin oil	2.00	2.00
Wingstay 100	1.00	1.00
Stearic acid	2.00	2.00
Amax #1	0.80	0.80
Zinc oxide	5.00	5.00
Sulfur	2.50	2.50
	161.30	156.30
Specific gravity	1.085	1.078
Optimum cure, temp. °F.	275	310
Time, min.	40	8

Investigations indicate that the use of *cis*-BR, when used as a compounding material, will provide a degree of quality improvement in tires unattainable prior to its introduction. The optimum in quality will be realized when compounding techniques peculiar to BR alone are utilized.[6]

Acknowledgments

The authors wish to thank the Goodyear Tire & Rubber Co. and A. J. Gracia and W. J. Lee for permission to publish this paper. Acknowledgment is also made to J. J. Hartz, S. C. Nicol, E. C. Montgomery, and K. W. Scott for their helpful suggestions.

[4] Bureau of Standards dynamometer, 67-inch, smooth flywheel.

[5] Bureau of Standards dynamometer, 67-inch flywheel, six 2- by ¾-inch cleats arranged equidistant around the wheel at right angles to the direction of rotation.

[6] Belgian patent No. 596,336, covering the use of the specific types of compounding ingredients which are contained in the recommended *cis*-polybutadiene formulations.

Free Catalyst Supplied with New Rubber Base

An entirely new fusible silicone rubber base, specifically designed for fabricating electrical insulating tapes, has been introduced by Union Carbide Corp., Silicone Division. The material, designated Y-3277 base, has been developed to provide the fabricator with the utmost flexibility in compounding and at the same time offer substantial cost advantages.

Perhaps the most attractive feature of the new base is the supply, at no charge, of a sufficient amount of catalyst, called YC-3277, with each purchase, if request is made at the time of ordering. Use of this special catalyst, states the manufacturer, assures a non-blooming tape; it also permits the fabricator to set the catalyst concentration without handling the peroxides directly.

Fusible tapes made from Y-3277 base will feature high tack and good surface gloss at any durometer hardness, as well as good physical and electrical properties, claims the manufacturer. The product can be ordered in clear, neutral, or colored shades, as desired, and will have excellent green (uncured) strength and extrusion rates.

In addition, states Union Carbide, the new base offers the extra advantage of greater stability and longer shelf life.

Fig. 1. This new aluminum-clad tower rises to a height of 126 feet and houses VCV equipment to produce rubber-covered wire and cable at the Kaiser Aluminum plant at Bristol, R. I.

Continuous Vulcanization—Tower Style

Vertical continuous vulcanization is used for rubber-covered wire and cable to meet increasing demands for larger, longer, and better-quality products

VERTICAL continuous vulcanization (VCV) equipment, considered to be the tallest and most advanced in the world, is now producing rubber-covered wire and cable. This $250,000 installation was started in production on May 25, 1961, by Kaiser Aluminum & Chemical Corp. at its plant in Bristol, R. I. The unit provides the company with a facility to manufacture rubber-covered wire and cable up to a three-inch cable diameter and up to rated insulations of 35,000 volts. The unit also enables Kaiser to meet the increasing demands of the electrical industry more efficiently and with a product of improved quality and appearance in sizes impractical with previous equipment.

The basic unit, a Davis-Standard[1] VCV, has been enclosed within a corrosion-resistant aluminum tower which rises dramatically to a height of 126 feet (Figure 1). Considerable engineering effort went into the tower construction and design to support the equipment, which virtually hangs from the top, to provide for personnel safety and convenience, and last, but not least, offer an esthetic appearance to the community. Provisions have also been made for the addition of subsequent units. An elevator for personnel and material convenience and efficiency is an additional feature of the installation.

Larger Sizes Possible

The equipment is designed to manufacture cables up to 3½ inches in diameter after insulation and 2,000 feet long. Prior equipment limitations, at Bristol, were 2,000 foot lengths of a 500,000 cm. (1¾ inches diameter) copper 15-kv. grounded neutral butyl-insulated neoprene-jacketed shielded power cable. By comparison, 5,000 foot lengths of the same cable are now possible with the new VCV installation.

By further comparison, the pan-lead method has critical length limitations, and a large horizontal continuous vulcanizer (HCV) is limited to an insulated diameter of 1.3 inches.

The cable to be insulated or jacketed first travels

[1] Davis-Standard, Mystic, Conn.

from a reel at ground level to a typical aluminum sheave five feet in diameter where it is then directed vertically up through a steam jacketed tube to improve adhesion characteristics by removing traces of moisture. At the top of the tower the cable is horizontally directed through a caterpillar drive capstan equipped with rubber treads for positive control. From here the cable is directed vertically down through a six-inch tuber equipped with a special crosshead to extrude downward (Figure 2).

100-Foot Chamber

The cable with the applied insulation then enters the special two-zone 100-foot-high vulcanizing chamber. In the first zone of approximately 75 feet, the vulcanization is activated by high-pressure steam; while in the second zone, the remaining 25 feet, the cable is cooled by high-pressure water. This cooling under pressure insures a good bond, good rubber density and improves the corona level. Back at ground level the insulated cable passes through a rubber orifice and is again horizontally directed where it successively passes through an additional 60 feet of cooling water, an electrical insulation tester, coating or marking devices (optional), and another caterpillar drive for adjustable tension control on to a take-up reel. The finished cable is then moved on to areas for inspection, packaging, and shipping.

The use of a 125-hp. motor on the extruder permits compounded material at room temperature to be fed directly, thereby eliminating a warm-up mill. Synchronized electronic controls coordinate the extruder drive and the caterpillar drive mechanisms throughout the entire speed range. A ratio control setting can be made to adjust automatically the proper feed balance between the two mechanisms to maintain diameter and insure dense, void-free insulation. This arrangement also eliminates "birdcaging" which can occur when the cable feed advances ahead of the tuber output.

The interface level between the steam and water in the vulcanizer/cooler chamber is maintained by a boiler level control. This control is augmented by strategically placed thermocouples which sense thermal changes and signal the operator through color lights so that he can make the proper adjustments. A 50-gpm. pump supplies the high-pressure water through a closed system.

At the top of the vulcanizing chamber is a five-foot-long motorized telescope section known as the "splice box." This arrangement permits free access for preliminary preparations such as initial splice operation (water-proofing), cable centering, die adjustment, and rubber consistency through the crosshead. When this section is closed, it forms the top seal of the vulcanizer. At the bottom of the continuous tube is an orifice consisting of four rubber diaphragms with an aluminum back-up plate which is adjustable to seal off effectively most of the high-pressure water.

Approximately 15 feet below the tuber, a glass viewing port is built into the vulcanizing chamber to enable visual inspection of the cable. This, of course, permits only casual inspection, and a sensing device using infrared light coupled with a signal system for the operator is being developed to provide more adequate control.

Automation, controls, and safety devices have been incorporated into the basic system wherever practical to provide for a very high-quality product, personnel safety, and ease of operation. Significantly, once the operation has been started, only two operators are required to maintain production.

In the HCV method, two major deficiencies are prevalent. First, defects caused by the insulation contacting the walls of the vulcanizer due to the catenary (droop) of the cable can be avoided only by extremely critical tension control. This is the major factor in its diameter limitation. Second, the position of the interface between the steam and water is most difficult to maintain.

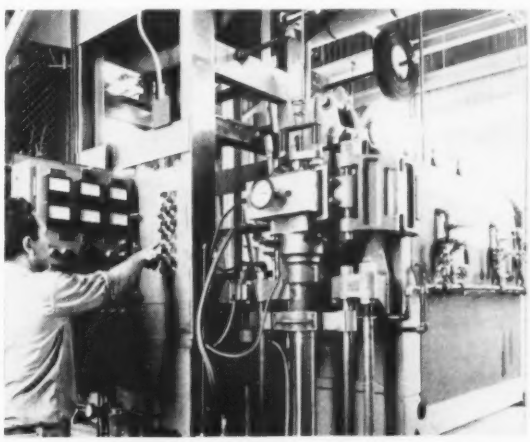

Fig. 2. A view of the special crosshead tuber and control panel located at the top of the tower

In the pan-lead method, flattening, deformation, crossover denting, imperfections caused by lead fill-ups and press stops, handling and soapstone markings are the more obvious defects. This process is slow and requires considerable labor.

Deficiencies Eliminated

In the VCV method these deficiencies are eliminated. Notably, by its vertical position, cable centering (providing uniform insulation thickness) and elimination of material contact with the sides of the vulcanizer (preventing insulation damage) are virtually assured. In addition to its increased productive capacities, the equipment enables products with improved quality and appearance to be manufactured.

The increased need of cables with higher voltage capacities, larger cable diameters, greater lengths, and heavy wall butyl insulation insure the future of this type of equipment. An additional factor in favor of VCV units is the increasing use of butyl rubber-insulated cables to replace existing conventionally insulated cables.

New Techniques for Evaluating Pigment Dispersion in Rubber—I[1]

Electron microscopy, microradiography supplement light microscopy for obtaining dispersion analysis in depth

By WILLIAM M. HESS

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The Author

William M. Hess, manager, physics research, was graduated from Long Island University with a B.S. degree in physics in 1950. He has been active in physics research on carbon black for Columbian Carbon since that time. His early work was done under the direction of W. A. Ladd, but since 1955 he has directed this aspect of Columbian's research. His paper, published here, won the Best Paper Award at the Spring, 1961, Rubber Division meeting

THE importance of achieving good pigment dispersion in rubber compounding is well known. Undispersed pigment agglomerates can have a twofold degrading effect. Besides forming structural weak spots in a rubber stock, such agglomerates also account for a lowering of the pigment loading elsewhere.

In the factory a simple examination of torn surface roughness[2] is often adequate as a production control of dispersion quality. A smooth torn surface is indicative of a good dispersion; while a rough, pimply tear indicates a poor dispersion.

This technique is particularly applicable for studying the dispersion of carbon black in styrene-butadiene rubber. It is the simplest to carry out, but a more direct method of analysis is desirable, inasmuch as dispersion is not a surface phenomenon. The pigment is a part of the internal structure of the rubber and in the laboratory, where suitable equipment is available, can best be observed by some form of transmission microscopy.

Part I of this article presents a general description of the techniques available for transmission microscopy. Part II, which will appear in the December issue of RUBBER WORLD, describes in detail methods of preparing and examining specimens for dispersion evaluation.

Types of Microscopy

The microscopic technique employed in a given dispersion analysis depends primarily on the type of pigment and the degree of resolution that is necessary. The light microscope is always used first when carbon black is involved. As early as 1920, Green[3] and others[4,5] used the light microscope for the examination of microtomed rubber sections, a technique further developed by Tidmus and Parkinson[6] and Leigh Dugmore.[7]

For a high percentage of stocks there is no need of further study. Undispersed agglomerates of carbon black can be resolved quite readily by this method because of their extreme opacity to light. Pigment agglomerations that are transparent to light are, however, often more difficult to resolve, particularly when they are contained in a black loaded stock.

X-ray microradiography utilizes differences in X-ray absorption to show up undispersed pigment agglomerates. It is suitable for dispersion studies whenever the

Fig. 1 (opposite page). Electron photomicrograph of an SBR white sidewall compound is magnified 30,000 times. The dispersion of 100 phr. of an 80-20 blend of ZnO and TiO_2 is extremely clear.

[1] Based on "Analysis of Pigment Dispersion in Rubber by Means of Light Microscopy, Microradiography, and Electron Microscopy," presented before the Division of Rubber Chemistry, ACS, Louisville, Ky., April, 1961.
[2] W. B. Wiegand, *Canadian Chem. Met.*, 10, 251 (1926).
[3] *Ibid.*, 13, 1029 (1921).
[4] H. A. Depew, I. R. Ruby, *Ibid.*, 12, 1156 (1920).
[5] E. B. Spear, R. L. Moore, *Ibid.*, 17, 936 (1925).
[6] *Trans. Inst. Rubber Ind.*, 13, 152 (1937).
[7] *Rubber Chem. Tech.*, 129, 1303 (1956).

25μ

specific gravity of the pigment differs significantly from that of the rubber polymer.

Most of the pigments that are used in rubber have relatively high specific gravity and can therefore be seen as regions of high X-ray absorption when they are poorly dispersed. Microradiography is, therefore, an excellent means of resolving agglomerates of high density pigments such as zinc oxide and calcium carbonate. It is also ideal for studies on unvulcanized rubber because of the relatively thick samples that can be examined. Thin specimens of raw stock shred apart quite easily during handling.

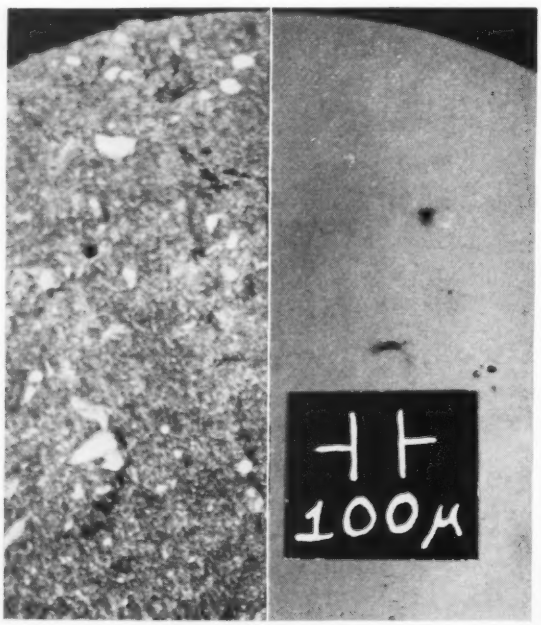


Fig. 2. Two methods of evaluating a poor dispersion of an 80-20 blend of zinc and titanium oxides are shown side by side: *left*, a light photomicrograph; *right*, a negative microradiogram of the same specimen, with the pigment particles white. The improvement in resolution is obvious.

The microradiography technique was used by Ladd[5] to study carbon gel formation and has been employed extensively at the Columbian laboratories to study the dispersion of black and curing agents in both vulcanized and raw stock.

In practically all cases the determination of the size and the shape of the ultimate pigment aggregates requires the use of an electron microscope. The preparation of suitably thin specimens is the major consideration in examinations of this type. The electron microscope is also used in comparisons of dispersion quality when the other methods have failed to show differences.

Going beyond the standard type of analysis, it is now possible to study directly the effects of varied dispersion quality by means of special tensile specimen holders

[5] Paper presented at the 1960 fall Rubber Division, ACS, meeting in New York.

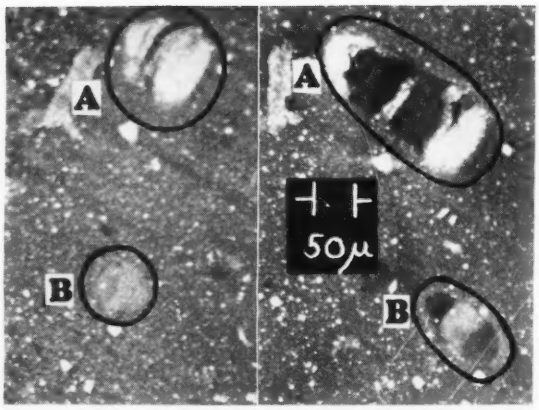


Fig. 3. A vulcanized SBR tread is microradiographed in the relaxed and stretched states. *Left* is the relaxed specimen. The large, diffuse light areas are agglomerates of carbon black. The smaller white specks are non-carbon materials such as zinc oxide. *Right* is the stretched sample. The large dark areas show an absence of pigments. Areas A and B are same areas before and after stretching.

for microradiography and electron microscopy. This type of investigation may be particularly valuable in elucidating the causes of tread cracking and lowered abrasion resistance. For example, small tears were observed to form around pigment aggregates in micro extension tests. Thus, the reinforcing capabilities of different pigments may be compared miscroscopically using this type of technique.

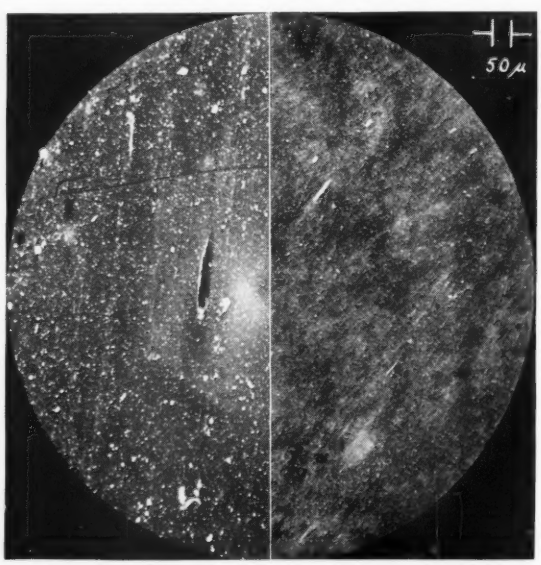


Fig. 4. *Left* is a negative radiogram of an SBR tread sample. *Right* is a polybutadiene tread stock. Both have been stretched to 400% elongation. At *left*, small regions of non-carbon agglomeration are pulling away from the rubber. No such phenomenon is apparent in the photo at *right*.

Through use of one of the techniques described, or by coordinated use of all of them, most dispersion problems can be resolved. The state of dispersion can readily be traced from coarse pigment agglomerates, a few hundred microns in size, down to the ultimate particles which can be below 20 millimicrons. A complete analysis of this type is often necessary to explain pigment effects on reinforcement.

Light Microscopy

Light microscopy is particularly suitable for resolving undispersed agglomerates of carbon black and has been applied extensively to the analysis of tread stocks.

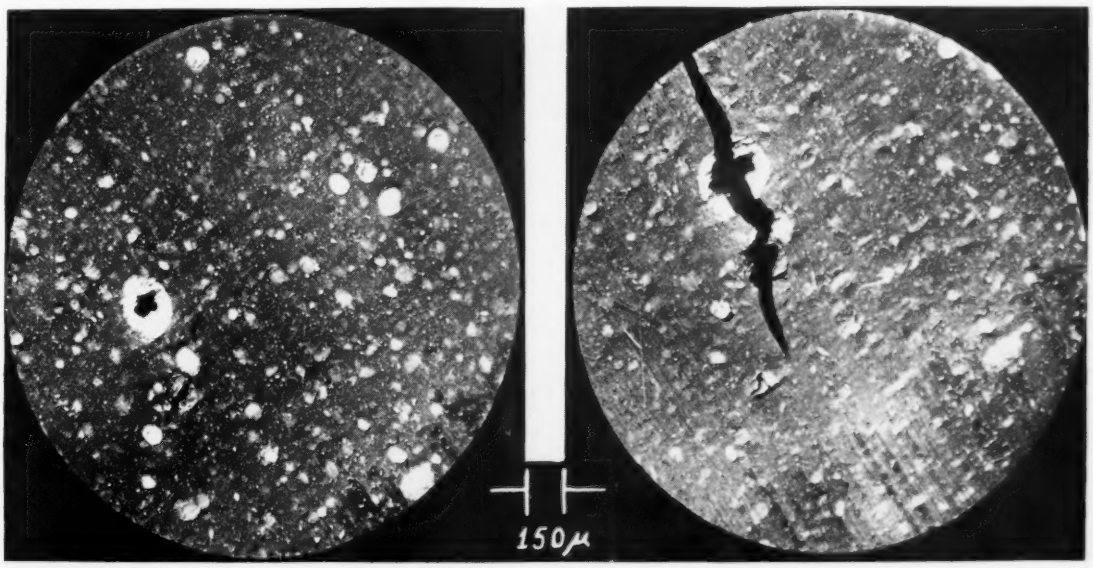


Fig. 5. An SBR tread sample is shown, *left*, in the relaxed state, and, right, after being repeatedly stretched to about 50% elongation. A crack can be seen at right, emanating from large undispersed agglomerates of black.

Poor black dispersion has consistently been associated with a significant loss of wear.

Experience has shown that a specimen 3 by 8 mm. in size will generally give adequate sampling. Conclusions are drawn from direct observation of the sections under the microscope rather than from micrographs. The quality of very poorly dispersed samples can usually be estimated. Better mixes are quantitatively measured with a net micrometer employing a modified version of the Leigh Dugmore technique. The entire section is first measured at very low magnification (40x) for coarse agglomerates and then partially screened at higher magnification (approx. 300x) for the fine ones.

Microradiography

Microradiography studies are carried out on a contact microradiography unit capable of producing extremely soft X-rays in the 1-3 k.v. (6-8 Å wave length). The rubber specimens are mounted directly on the emulsion of the fine grain recording film. A typical exposure for a 20-micron thick sample is four minutes at 3.5 k.v. To increase contrast, the accelerating potential of the X-ray beam is dropped, and thinner specimens are used.

Since contact microradiograms are the actual size of the specimen, they must subsequently be enlarged optically. This work is best done under a light microscope, where the negatives can either be directly examined or rephotographed and printed at higher magnification.

Figure 2 shows a comparison of a micrograph and a negative microradiogram of the same specimen of an SBR white sidewall compound containing a 100 phr. loading of an 80-20 blend of zinc and titanium oxides. Section thickness was 10 microns. The mixing time of the stock was deliberately cut to produce a poor dispersion. In the light micrograph the pigment particles appear black; in the radiogram they appear white.

The obvious improvement in resolution over the light microscope method is quite apparent. The outlines of the pigment agglomerations are much more clearly defined by microradiography. In a carbon loaded stock, agglomerates similar to these are even more difficult to resolve by light microscopy.

Testing under Strain

The relatively large, thick specimens that are suitable for X-ray examination make this method ideal for examining rubber stocks while they are under strain. Microtome sections in the 20-40 micron thickness range can be handled quite easily and therefore make ideal micro test pieces.

The purpose of this type of X-ray analysis is to study directly the effects of variations in dispersion quality.

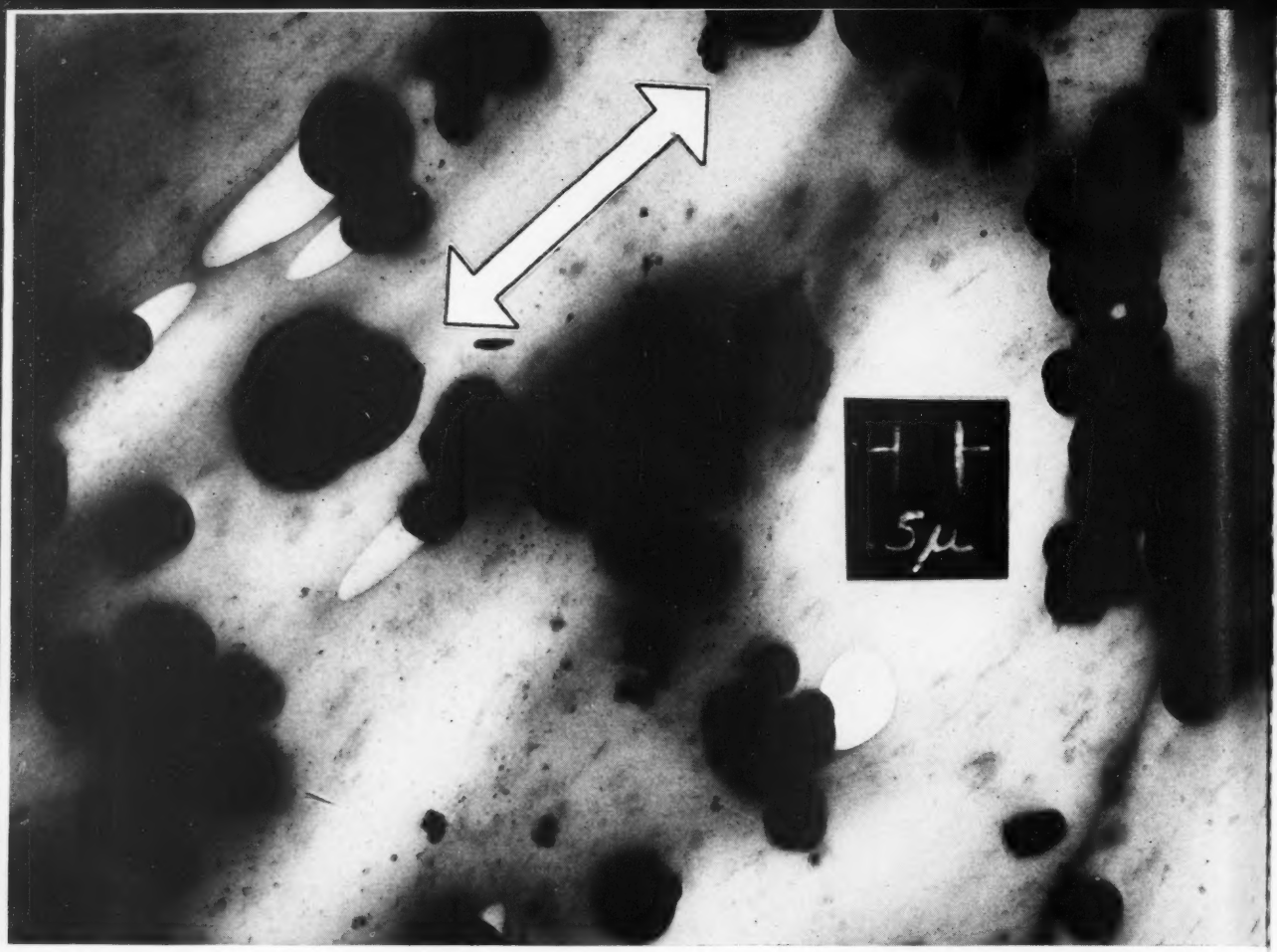


Fig. 6. An electron micrograph of a tensile specimen of a natural rubber compound containing a 50 phr. loading of Thermax shows what happens at an elongation of more than 200%. The rubber has pulled away from some of the particles, much as in the left-hand radiogram in Fig. 4. Arrow indicates direction of stress.

Specimens examined while they are under strain will often give a better indication of performance than those examined in the relaxed state. A particularly good application is the analysis of highly reinforced tire treads which are subjected to severe stress on the road.

Application of this technique to the study of black-loaded SBR tread stocks has shown that many carbon and non-carbon agglomerations will rupture when the rubber specimen is extended to fairly high elongation. Large, fairly "dry" agglomerates will break open quite readily. Smaller areas of pigment agglomeration must be subjected to considerably greater stress before they will pull apart.

Figure 3 shows two negative microradiograms of a vulcanized SBR tread stock, X-rayed in the relaxed state, and then X-rayed after the specimen had been stretched to an elongation of slightly more than 150%. The large diffuse light areas are attributable to agglomerates of carbon black; while the smaller, more contrasting white specks are caused by high-density non-carbon materials such as zinc oxide. The dark regions within the agglomerates, particularly noticeable in the stretched sample, signify free passage of the X-ray beam. The weakness of these areas is therefore quite apparent.

Figure 4 shows a comparison of negative radiograms, one of an SBR tread sample, and the other of a polybutadiene tread stock. Both specimens have been stretched to about 400% elongation.

In the SBR tread sample, small regions of high non-carbon agglomeration can be seen pulling away from the rubber. These, then, as well as undispersed clumps of black represent potential weak spots in a tire.

The relative amount of stress that is required to rupture undispersed carbon agglomerates in a tread stock appears to be dependent on how well the black has been wetted down by the polymer. Very few agglomerates of black in a vulcanized stock are completely dry. At least some penetration of the polymer will usually occur. Where very complete wetting action has taken place, the agglomerates effectively have a lower specific gravity and therefore appear more diffuse when examined by microradiography. This type of agglomerate exhibits much greater tensile strength than one in which some dry pigment exists.

Studies on carbon reinforced polybutadiene tread compounds have indicated excellent pigment wetting action by this polymer. Specimens X-rayed under strain have shown very little tendency to pull apart, even when the black dispersion was rated quite poor under the light microscope, as Figure 4 shows. Very little degradation is apparent in this specimen. Yet by light micro-

scopy the black dispersion in this stock had rated extremely poor. Rubber properties for this sample and similar types of compounds have been more in line with the X-ray results. Therefore it appears that because of better pigment wetting, poor dispersion is not so serious a factor in polybutadiene as in SBR.

A somewhat different version of the X-ray tensile technique has also been applied to the study of SBR tread compounds. After the stretching and relaxing of tread specimens repeatedly for several minutes, it has been observed that small cracks or tears started at an aggregate of undispersed pigment. Further treatment will enlarge them until ultimately the entire specimen will split apart. The action can be accelerated greatly by a mild ozone treatment.

Figure 5 shows microradiograms of a very poorly dispersed SBR tread sample before and after being repeatedly stretched to about 50% elongation. A crack can be seen emanating from two very large undispersed agglomerates of black. With further treatment this specimen failed completely. Other studies have shown similar crack formation around non-carbon agglomerations.

Electron Microscopy

The use of the electron microscope as a tool for dispersion analysis is somewhat restricted because of the small size of the specimen being examined. In addition, however, to being used to resolve the size and the shape of the ultimate pigment particles, the electron microscope is used to compare dispersion quality when other methods have failed to show differences.

Figure 1 shows an electron micrograph of a typical SBR white sidewall compound which can readily be microtomed for electron microscopic examination.

Tensile Microscopy

Through use of a special specimen holder it is now possible to observe directly behavior of thin specimens under strain in the electron microscope. This technique was applied recently by Ladd to the study of carbon loaded rubber films. It is now being employed extensively at the Columbian Carbon Co. laboratories in order to study the effects of pigment dispersion in vulcanized tire treads.

Figure 6 shows a micrograph of a tensile specimen of a natural rubber compound containing a 50 phr. loading of Thermax. Elongation is more than 200%. The rubber has pulled away from some of the particles much in the same manner as it did from some of the agglomerates in the X-ray tensile specimen.

Breaks that occur suddenly under high strain have generally shown linear edges. The path of tear will, however, as a rule circumvent particularly dense concentrations of pigment. A very slow tear is almost always diverted or stopped completely by large pigment aggregates. This type of action has for the most part been recorded on movie film so that the progress of the tear can be traced more completely.

Conclusion

Part I of this article has described the use of three types of transmission microscopy, and tensile testing techniques used with two of them, to evaluate pigment dispersion. Part II will describe a liquid nitrogen technique used for microtoming samples, the microtoming techniques, and the tensile testing devices which were used in order to obtain the results that have been described in Part I.

(*To be continued*)

"Purple-K" Fire Extinguishers Introduced

"Purple-K" fire extinguishers, which have proved up to twice as effective on gasoline and oil fires as any extinguishers previously known, were recently introduced at the National Safety Congress in Chicago's Conrad Hilton Hotel.

Originally developed by the Naval Research Laboratory, and now produced by Ansul Chemical Co., Marinette, Wis., "Purple-K" is a potassium bicarbonate-base dry chemical for use on Class B and C (flammable liquid and electrical) fires. It is similar in consistency and appearance to sodium bicarbonate-base dry chemical which up to now has been the most effective agent for flammable liquid and electrical fires.

Under Ansul test conditions, operators consistently extinguished 50 square feet of gasoline fire with an extinguisher containing 4½ pounds of "Purple-K," and 75 square feet of gasoline fire with an extinguisher containing nine pounds of the agent. Comparative models of sodium bicarbonate dry-chemical extinguishers which contain slightly more agent would put out only 25 and 60 square feet of fire, respectively.

The most noticeable differences in performance noted by Ansul between "Purple-K" and sodium bicarbonate extinguishers are:

(1) It takes less "Purple-K" to extinguish a given area of fire.

(2) Operator technique is not so critical for successful fire combat because "Purple-K" does not allow fuel to reflash as easily as sodium bicarbonate does.

(3) The first application of "Purple-K" does not result in an initial flare-up.

Electronic-Hydraulic Die Cutter Challenges Conventional Clickers

Hydraulic device said to produce parts faster and cut costs, owing to more uniform cutting, use of varied die heights without adjustment

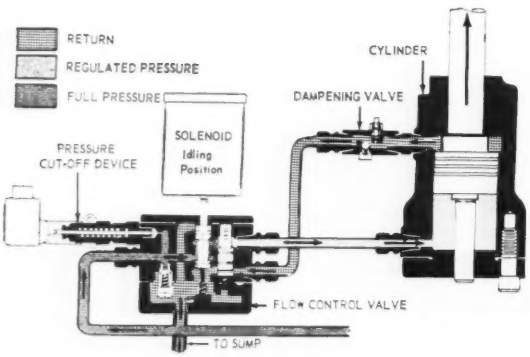


Fig. 1. Hydraulic fluid flows into top half of cylinder at full pressure, bringing beam down in cutting stroke. Hydraulic valve solenoid is in operating position

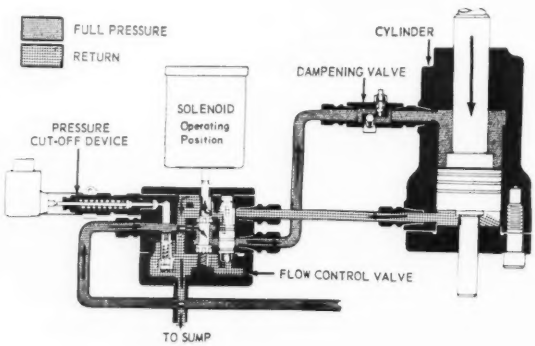


Fig. 2. Die, not shown, cuts through the material and contacts the conductive cutting surface, closing a circuit which disconnects the hydraulic valve solenoid. Fluid flows into the lower half of the cylinder, stopping the downstroke and returning the cylinder to former position for another cut

A NEW, electronically controlled hydraulic die cutting machine, which is claimed to produce die-cut rubber parts faster and at lower cost than the conventional impact machine, has been developed by United Shoe Machinery Corp., Boston, Mass.

The company says its Hytronic die cutting machine has about the same cycle time as a clicker, but claims the machine can increase production in the average shop because:

Cutting is cleaner and more uniform, eliminating waste.

Dies differing in height as much as 2⅜ inches can be used for successive runs without adjusting the beam, nearly eliminating set-up time.

Less downtime is required for sharpening or replacing dies, because the hydraulic cutter is less hard on dies than a clicker.

Lack of noise and vibration means less worker fatigue.

The Hytronic die cutting machine uses its electronic controls to control the stroke automatically.

In the cutter assembly the ram and the cutting surface are both part of an electrical circuit. During the cutting operation oil pressure is directed to the upper part of the cylinder to drive the ram (Figure 1).

When the die driven by the ram cuts through the material to be cut and contacts the cutting surface, it completes an electrical circuit. This switches off an electrical solenoid valve, causing the hydraulic oil to flow from the upper cylinder chamber into a dampening valve, stopping the downward stroke and returning the ram to its original position (Figure 2).

The cutting surface is either a conductive rubber pad or an aluminum cutting surface. In the case of the aluminum, in order to eliminate indentations in the surface, the pad is wrapped with three layers of insulating tape, and the die must cut through the tape in order to complete the circuit and stop the stroke. No wrappings are necessary with the rubber surface.

Varied Die Heights

The Hytronic die cutting machine can use dies ranging in height from 5/16-inch to five inches. Dies differing in height by as much as 2⅜ inches can be used in successive runs without adjusting the beam. The beam would simply be adjusted in the beginning to clear the highest die in the set.

This arrangement, the company says, means that dies need only be reconditioned when they have to be sharpened, without any worry about reconditioning die sets in order to maintain die heights.

The cutting machine will deliver up to 30,000 pounds of hydraulic pressure, regulated according to the resistance of the material to be cut and the sharpness of the die. As the die becomes less sharp during a long run, the pressure can be increased to continue making complete cuts. Since the stroke is not completed until the material is cut through, materials of different thick-

ness can be cut without varying beam height, as long as the beam is high enough to clear the thickest material to be cut.

Roth Rubber Co., Chicago, Ill., which uses the machine to cut both raw stock and vulcanized rubber into washers and gaskets and also uses it in trimming flash, estimates that it has 10% less waste due to cleaner cutting than with its old clickers and notes that the company has increased production because the Hytronic cutter can be used with multiple dies and can cut closer to the edge than with a clicker. Downtime and set-up time are 25% less, Roth Rubber Co. reports.

Roth Rubber uses both 1¼ by ¼ clicker dies and multiple or gang punch dies.

Crown Rubber Co., Fremont, O., which uses single- and multiple-cavity steel dies for cutting rubber floor mats, stair treads, floor tile, and a large number of what it describes as "intricately shaped" specialty items, estimates a 10% increase in production since switching to the Hytronic machine from a clicker.

Crown Rubber says that because the ram stops its stroke after cutting through the material, dies are not distorted under pressure, thus remaining sharp longer. As a result, cutting is exact and uniform, and the cost of maintaining and replacing dies is considerably reduced, the company reveals.

Less Rugged Dies

Crown also notes that the dies have to be less rugged with the hydraulic cutter and adds that for this reason more intricate dies can be used.

Shaw-Randall Co., Pawtucket, R. I., which uses the machine for blister packaging, estimates that it has cut waste 8-10% because the clicker machines often caused the dies to bounce, creating double cuts and spoiling both the blister material and the cardboard backing, General Manager C. Knowlton Shaw, Jr., stated.

He also indicated that die costs were $14,000 to $18,000 a year before the Hytronic machine was installed. The die costs have now been reduced $1,000 to $1,200 a year, or about 7%.

"This is because we now get up to 30,000 impressions before we have to have a die reknifed," he explained. "The oftener we have a die reknifed, the sooner it must be replaced. Also, we had to buy heavier, more rugged dies for the clickers, and even so weldments were often broken by the pounding. We have no more of that."

Both Roth Rubber and Shaw-Randall say that the quiet operation of the hydraulic machine is a plus factor in its operation.

"We also like the noise control afforded by Hytronic," Shaw stated. "We find great improvement in employe morale, and equal reduction in fatigue. With the clickers, the noise sapped the nervous energy of the operators."

"In our case," he added, "there's also a tremendous advantage in the fact there's no vibration from Hytronic cutting machines. Our die-cutting department is on a wooden floor directly above our executive offices. With the other Model C's (clickers) those offices were virtually untenable."

Roth notes that its machine is located directly below its offices, but that no noise is transmitted to them.

United Shoe Machinery says also that because of the lack of vibration the machine can be installed wherever the floor will support the weight of the machine. No special bracing is needed to counteract vibration. Since the Hytronic cutter is about 1,600 pounds, compared with perhaps 2,500 pounds for a clicker, and since the cutter is only 58 to 62 inches high, or about 1½ to 2½ feet lower than the average clicker, it can go into spots where a clicker might be too bulky, the company explains.

The Hytronic can be obtained in beam sizes of 28 by 13 inches, or 31 inches by 13, 18, or 24 inches. Either a 36- by 18-inch or a 40- by 20-inch cutting surface is available. Machines may be paired for handling material up to 42 inches wide, or for using unusually large dies.

Convenient, Stable, One-Can Epoxy Systems

A one-can system may be utilized for epoxy resin formulations by containing the catalyst in a molecular sieve from which it will be released at the proper time.

This new use for these Chemical-Loaded Molecular Sieve products was recently announced by the Linde Co., Division of Union Carbide Corp. CLMS materials have been in use by the rubber industry for a number of years to provide similar protection to accelerators or other compounding ingredients.

Epoxy catalysts such as simple polyamine, modified polyamine, and tertiary amines are adsorbed on to the CLMS and held within the pore structure until released by the application of heat or the introduction of a displacing agent such as water.

The catalyst, completely isolated from the resin by the molecular sieve, may be intimately and uniformly premixed with the resin in a single can, thus eliminating the need of a second can. The resulting product not only provides the convenience of a single-can system, but offers extremely long shelf life and lower cure exotherms in many cases. The long shelf life and pot life are provided while the cure rates normally associated with the pure hardener are maintained.

Advantages claimed for the producer include lower manufacturing costs by requiring only one production line, simplified packaging, and less labor. For the user, Linde suggests benefits which include the elimination of waste, decreased time and labor by requiring less handling and no mixing, and that the CLMS materials permit safe use of toxic polyamines.

Report of Food Additives Act Given At Chicago Rubber Group Meeting

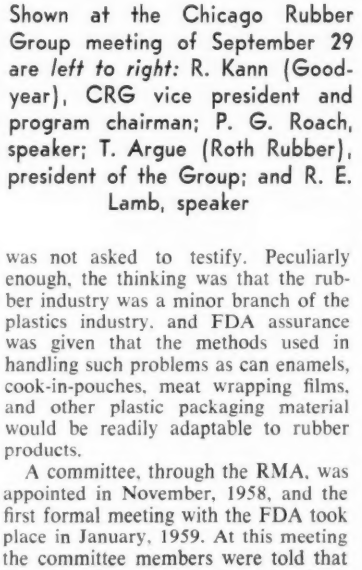
The problems facing the rubber industry in complying with the indirect additives condition of the recent Food Additives Act was reported on at the Chicago Rubber Group meeting held September 29. A group of 225 people heard P. G. Roach (Texas-U.S.) discuss the subject under the title of "Klarified Konfuzion" and also heard R. E. Lamb (Waukesha Rubber) give a "Progress Report on the RMA[1] Sub-Committee on Food Additives."

Product Manufacturer Liable

Dr. Roach explained that the Food Additives Act became effective September 6, 1958, and declared substances subject to law if they directly or indirectly become a component of food. This act was extended in 1961, and proof of safety is required by June 30, 1964. The indirect additives condition covers rubber products among other materials. The speaker pointed out that the rubber manufacturer must decide whether his products are affected by the law under the following conditions: A—during use, product can reasonably be expected to become component of food; B—during use, product imparts a component to food when component is not "GRAS" (generally recognized as safe); C—use of product specifically sanctioned or approved by FDA prior to September 6, 1958. Emphasis is on degree of exposure, and rubber product exposure examples are classed as: major—baby nipples, chewing gum, and meat wrappers; medium—conveyor belts and lined tanks; minor—aprons and boots. He also noted that the raw material supplier has no legal liability; whereas the rubber product manufacturer is legally liable.

Lamb pointed out that when the Food Additives Act became law in 1958, the rubber industry was caught by surprise. Two years prior to the enactment, hearings were held, and testimony was given about the need of a regulation to control direct and indirect food additives, but the rubber industry

[1] The Rubber Manufacturers Association, Inc., New York, N. Y.



Shown at the Chicago Rubber Group meeting of September 29 are *left to right:* R. Kann (Goodyear), CRG vice president and program chairman; P. G. Roach, speaker; T. Argue (Roth Rubber), president of the Group; and R. E. Lamb, speaker

was not asked to testify. Peculiarly enough, the thinking was that the rubber industry was a minor branch of the plastics industry, and FDA assurance was given that the methods used in handling such problems as can enamels, cook-in-pouches, meat wrapping films, and other plastic packaging material would be readily adaptable to rubber products.

A committee, through the RMA, was appointed in November, 1958, and the first formal meeting with the FDA took place in January, 1959. At this meeting the committee members were told that the rubber industry indeed was involved, and an end-clearance on a product by product basis was necessary. Shortly after that, the FDA extended the deadline to March, 1960. It had already found that it was an impossible task to get regulations written on the vast number of direct food additives, let alone the indirect chemicals. In September, 1959, another meeting was held, when it was pointed out that the rubber industry was not a branch of the plastic industry, that there was a huge number of different rubber products in contact with food, and the problem was further complicated by different formulations with each company for the same product. In spite of all this, the FDA still felt that the problems could be handled in the same manner as plastics. In December, 1959, an RMA survey revealed the mountain of material that had to be sifted.

Specification Approval

Additional meetings were held and in April, 1960, the FDA, already faced with similar problems in other industries, was considering a system of "Approval by Specification." Simply stated, this means that FDA can write a regulation which will cover an industry by setting limits beyond which manufacturers should not go. These limits are two-fold: first, ingredients must be selected from a "White List" of materials that had been carefully screened for safety; second, the ingredients must pass some method of testing that would effectively pinpoint any rubber product that might be imparting more than a safe limit of indirect additives to food.

A "White List" was compiled from data of a previous RMA survey and filed with the FDA in April, 1960. This list has since been revised. Meanwhile, 12 laboratories had been conducting a series of tests on different elastomers to establish methods of test and limits on extractability. These data were compiled and put together in the form of a petition which was filed with FDA in January, 1961. Certain revisions were required, and a final petition was filed in April, 1961.

Mr. Lamb indicated that through conferences with the FDA there probably will not be any resolute action taken before January, 1963. In the meantime the industry can operate as is with the "White List" and "GRAS" materials.

Data were presented showing a summary of gross extracts on 52 different

stocks. All of the basic elastomers, plus some blends, were checked for extraction rates in water and hexane under test methods patterned after ASTM[2] D 471. Water residues ranged from 0.004 to 8.1 mg/sq.in., and hexane, 7.3 to 105.6 mg/sq.in. In the petition, safe limits for water and hexane were set at 20 and 200 mg/sq.in., respectively. In most instances, using typical food handling products, these extraction rates represent a loss in food of way below 0.10 ppm. or, comparatively, one-tenth of a jigger of vermouth in a barrel of gin for a dry martini. Lamb went on to point out that many toxic materials, including deadly poisons such as strychnine and cyanide, have toxic limits, many of them up to quantities as much as 10 ppm. without harmful effects.

If the FDA holds to the letter of the law, the advantage is that it knows the public is absolutely safe. However, the speaker pointed out, this could lead to essentially eliminating all food handling with any material, for all materials will extract, abrade, or dissolve, even including platinum so that we might end up going "back to nature."

The resolution of this problem of setting practical limits depends upon the establishment of proper and adequate analytical methods. If a practical zero is the established limit, tremendous time and effort will be required to develop an analytical method and would eliminate many safe and useful materials, but would protect the public. On the other hand, safe tolerances (beyond any reasonable doubt) could encourage development of materials, but could also create adverse public criticism.

Ban Cancer-Producing Materials

The course of action which the FDA has decided to follow is to prevent the use of known cancer-producing materials and to set limits on extractability in simulated food solvents.

Mr. Lamb said that eventually there will be some kind of regulation and predicted that the question of "what's in this extract" could lead to the requirement of animal feeding studies. He went on, stating that once a regulation is issued, the rubber manufacturer can certify that he is complying and that then suppliers to the rubber industry would probably have to enter the picture. He recommended that elastomer suppliers establish standard formulas of a type that might be used by the food industry and then identify the components in the gross extracts. Chemical suppliers should do the same thing, except that they should determine how much and in what form their material is extracted by simulated food solvents. Published data from both sources would give rubber chemists and compounders greater confidence in the materials with which they are working in regard to products contacting food.

He urged that in view of these regulations, with more stringent measures probably in the future, continued research would seem to be good business to offset the potential hazard. He suggested that since industry action has worked well for other groups, a good course to follow would be through the RMA instead of individual action directly with the FDA.

Optical Dispersion Studies Described

The Elastomer & Plastics Group, Northeastern Section, ACS, held its annual meeting on October 10, at Science Park in Boston, Mass. The dinner-meeting was attended by 45 members and guests at which new officers were elected, and A. I. Medalia, Cabot Corp., spoke on "Determination of the Dispersion of Carbon Black in Rubber."

The officers elected for the 1961-62 season are: chairman, J. Donahue (Goodyear); chairman-elect, H. S. Anthony (Tyer Rubber); secretary, E. E. Ross (T. C. Ashley Co.); treasurer, F. P. Canty (Terrell Corp.); custodian, W. A. White (AVCO); hospitality chairman, A. J. Peros (Goodrich Chemical); and executive committee, L. Leaman (Majic Chemical).

Dr. Medalia's talk was concerned with the qualitative and quantitative measurement of the degree of dispersion of carbon blacks in elastomers by the use of optical procedures. He reported that the presently favored technique was examination under transmitted light at 80 magnifications through microtome samples of vulcanized films less than 2-3 microns thick.

Under this method, dispersed carbon black scatters the blue light and results in a red or brown-orange background to the detailed field. The undispersed carbon black shows up as black to gray masses with sharp edges.

Examples of poor dispersions from too short a mixing cycle were shown. Dr. Medalia recommended a form of split mixing wherein a high-viscosity first-stage mix secured dispersion and was "let-down" in the remainder of the batch as a remedy for that condition. Too stiff a first batch was as bad as a single mix and showed poor dispersions of such first batches in the matrix of partially finished second-batch stock.

Dispersant-free black masterbatches showed no brown coloration in some brands, he said, but a four-minute mix in a Banbury showed good dispersion with an occasional island of the heavy black masterbatch in the matrix.

Dr. Medalia then showed how a mathematical rating could be applied to show the percentage of dispersed carbon black.

Other optical procedures, hand tests, and other coarse physical estimates were discussed in the presentation and also during the discussion period that followed.

The next meeting is scheduled for November 21 at Motel 128, Dedham, Mass., with a speaker from Fabric Research Laboratories on the subject of spinning fibers from hot-melt plastics, and the testing equipment used in their evaluation.

Fort Wayne Group Panel on Elastomers

Four panelists from Polymer Corp., Ltd., spoke on *cis*-1:4 polybutadiene, SBR, butyl and nitrile rubbers before 153 people at the September 28 dinner-meeting of the Fort Wayne Rubber & Plastics Group.

Z. J. Dorko discussed the excellent abrasion resistance and high resilience as two outstanding characteristics of very high *cis* content polybutadiene. He also elaborated on other fundamental properties such as good low-temperature retraction, very low water absorption and low heat buildup useful in solid rubber tires, wire insulation, V-belts, golf ball centers, and floor tile. In all instances cited, the high *cis* content polybutadiene was processable on conventional equipment without the use of natural rubber.

E. E. Gale dealt with the trend in recent years to easier-processing polymers of the SBR type and with the use of a mixing index scale which enabled the factory processing of the Polysar Krynols to be predicted. This index also allowed the factors in the polymerization system governing good processing to be determined. The speaker plotted the trend of black masterbatch as a function of mixing capacity and as an acceptable method whereby the high structure furnace blacks can be incorporated into tread compounds allowing a satisfactory degree of safety from a factory processing point of view.

R. C. Klingender reviewed butyl rubbers and emphasized the newer specialty grades Polysar Butyl 101, 450, and 600. The first of these has been used primarily in chewing gum base. With the increased interest in the United States for FDA approved materials, this elastomer is finding new uses in food conveyor belting and as a coating material in conjunction with wax in the food packaging industry. Klingender also described the use of the other butyl rubbers in such unique applications as roofing, bridge bearing pads, and wharf bumpers.

W. Abrams spoke on the development of Polysar Krynacs as easy-processing nitrile rubbers produced in a cold polymerization system. He elaborated on the incorporation of poly (vinyl chloride) to improve the ozone resistance in nitrile rubber vulcanizates.

[2] American Society for Testing and Materials, Philadelphia, Pa.

Stereo Rubbers Feature Of Tri-Group Meeting

George Vila addresses a combined meeting of the New York, Philadelphia and Connecticut Rubber groups, October 20, at the Henry Hudson Hotel in New York. Flanking him, *left to right*, are R. N. Henrickson, chairman of the Philadelphia Group; Henry Peters, chairman of the New York Group, and Frank Smith, chairman of the Connecticut Rubber Group

Several of the newest types of Ziegler catalyst polymers, generally referred to as stereo rubbers, were described October 19 at a joint meeting of the New York, Philadelphia, and Connecticut Rubber groups. More than 400 persons attended the technical session at the Henry Hudson Hotel, in New York, N. Y., and 320 the dinner which followed. George R. Vila, president of United States Rubber Co., was dinner speaker.

The papers included two on ethylene-propylene rubbers, one on black-loaded crosslinked polyethylene, and a fourth on *cis*-polybutadiene, *trans*-polybutadiene, and solution polymerized SBR. All are solution polymerized with Ziegler catalysts, but neither the ethylene-propylene rubbers nor the SBR are stereo specific, and the crosslinked polyethylene is stereo specific, but not normally considered a rubber.

Cis-Polybutadiene

H. E. Railsback, manager of the rubber compounding laboratory of Phillips Petroleum Co.'s research division, discussed three Phillips rubbers, Cis-4 polybutadiene, with a 95% *cis* content; *trans*-polybutadiene, with 85-90% *trans* content; and an SBR solution polymer with 75% butadiene and 25% styrene content. At least seven companies now have plans to construct full-scale plants for production of *cis*-polybutadiene, he said. Phillips has been in full-scale production of Cis-4 for about a year. Cis-4 has given outstanding performance in tire tread and carcass compounds because of its low heat buildup and good abrasion resistance, he added.

The speaker also noted that Phillips is currently marketing *trans*-polybutadiene from a semi-commercial plant for use in hard rubber stocks and is conducting market studies of its SBR copolymer, which is of interest for wire and cable, shoe sole, and molded goods applications.

Ethylene Propylene

E. Leonard Borg, Naugatuck Chemical Division, U. S. Rubber, discussed the properties of ethylene-propylene rubber. Both ethylene and propylene form stereo regular, crystalline plastics, but they may be combined randomly to form a rubbery copolymer, he noted. He explained that the practical composition of ethylene-propylene copolymers is limited to those copolymers containing 45 to 75% propylene by weight, in order to get reasonably good strength while maintaining rubbery qualities.

He also explained that EP rubber is a fully saturated polymer, which gives it good resistance to light, heat, oxygen and ozone aging, but makes it impossible to cure with conventional systems. Use of a peroxide together with a small amount of sulfur gives a good cure, he said.

In a tread stock, saturated EPR has good physicals, fair to good abrasion resistance, a low brittle point, outstanding resistance to flex cracking, and excellent resistance to high temperatures and oxidation, Borg said. In a wire and cable stock it has excellent electrical properties and good resistance to ozone and heat, he declared, comparing EPR with neoprene and butyl.

Borg also discussed the improvement in physical properties that can be obtained by introducing some unsaturation into an EP rubber, explaining that the vulcanizates appear to retain the desirable characteristics of the saturated rubber.

Chester C. McCabe, of E. I. du Pont de Nemours & Co., Inc., discussed Du Pont's work with an ethylene-propylene rubber incorporating non-conjugated dienes which act as crosslinking sites in order to improve crosslinking of the polymer. The result is a sulfur-curable elastomer. The dienes are incorporated in order to make possible sulfur curability without losing the good aging of the saturated polymer, he explained.

McCabe discussed specific curing systems for the polymer, noting that the preferred accelerators are the same as those preferred for natural rubber, although the relatively slower rate of vulcanization requires a higher accelerator concentration, higher curing temperatures, or both.

The speaker explained that the terpolymer has extremely high resistance to ozone and to ultra-violet radiation, excellent resistance to heat, steam, and oxidation, and very good electrical properties. Its dynamic properties are between those of natural rubber and SBR, he said.

Crosslinked Polyethylene

P. R. McClure, of Cabot Corp. research laboratories, told the audience that crosslinked polyethylenes reinforced with carbon black are moving into commercial production because of excellent weathering resistance, good electrical qualities, and good physical, chemical, and thermal properties. Most present formulations are based on low-density resins, but with the availability of crosslinking agents having a higher

New officers of the New York Rubber Group, *left to right*, are Frank J. Raba, sergeant-at-arms; M. E. Lerner, secretary-treasurer; Glenn C. Vickery, member of the executive committee; Americus H. Woodward, vice chairman; Ralph DeTurk, chairman; and James Fusco and W. F. Wade, members of the executive committee. George Winspear, executive committee member, was not present when the picture was taken

activation temperature it has become possible to crosslink high-density polyethylene resins, he said. This results in considerable improvement in strength, particularly at elevated temperatures.

Need of Productivity

Vila, in his dinner talk, noted that development of stereo-regular rubbers has given the rubber industry the ability to make polymers precisely to specification, giving them new freedom in raw materials. However, he said, this does not solve the industry's problems.

One of those problems, he stated, is that new plants in Europe are modern and efficient, and productivity is high.

"I do not believe we can maintain our overseas markets and our leadership in productivity unless we close ranks," he said. "The quality of our workmanship must improve, and the productivity of our industry must keep on advancing. Such productivity increases must occur not only on the production line, but in the office and among management people as well."

Vila told the Group that he had talked before the New York Rubber Group once before, in 1939. What was then the New York Group has become four groups, in New York, Philadelphia, Connecticut, and Washington, he said.

He also discussed the changes in the rubber industry and the country as a whole in the 22-year interval, the increase in population, prices, the number of motor vehicles, and the consumption of rubber.

1962 Officers

New officers of the New York Rubber Group, announced at the meeting, were: Ralph DeTurk, The Beckham Co., chairman; Americus H. Woodward, Du Pont, vice chairman; M. E. Lerner, *Rubber Age*, secretary-treasurer; Frank J. Raba, American Cyanamid Co., sergeant-at-arms; W. F. Wade, Acme Hamilton Mfg. Co., Glenn Vickery, General Tire & Rubber Co., George Winspear, R. T. Vanderbilt Co., and James Fusco, Enjay Chemical Co., directors.

Use of Factice For Extrusions

New factices produced by the Rhein Chemie of West Germany were tested for their effects in tube or profile compounds of natural and synthetic rubbers. (*Rev. gén. caoutch.*, May, 1961, p. 761). The sulfur factices, Badenia C and D, as well as the sulfur chloride factices, Rheinau H and W, were studied in light-colored natural rubber compounds; the special factices, Asolvan and Schmelzfaktis A (semi-liquid factice), in compounds based on butadiene-acrylonitrile rubber; and Asolvan, Faktis N.W., and Flussiger Faktis (liquid factice) in neoprene compounds.

The Badenia and Rheinau grades of factice very slightly retarded vulcanization of the natural rubber compounds; they improved flow characteristics, but hardly affected extrudability. On the whole, mechanical properties were lowered, especially with 40% factice; with the Badenia factices there was some improvement in elasticity and resistance to repeated flexing.

Asolvan and Faktis N.W. not only gave the advantages of quicker extrusion, improved profiles, and smooth surface, but also increased flame resistance without detriment to the oils and solvents in the elastomers used; resistance to oils and solvents was practically on the ASTM level. The liquid factices, Schmelzfaktis A and Flussiger Faktis, gave mixes that were very plastic in the uncured state and had low modulus and hardness when vulcanized.

The general conclusion was that these factices facilitate extrusion and improve thermal and dimensional stability of mixes, without any considerable change in mechanical properties.

Tlargi Honors Banbury

At its regular monthly meeting on October 3, The Los Angeles Rubber Group, Inc., honored F. H. Banbury as its thirteenth honorary life member. This honor is reserved to those men "who have contributed outstanding and unselfish service to the rubber industry and to Tlargi." The inventor of the Banbury mixer was introduced in a speech which traced and highlighted his career from his start in England, his graduation from Purdue and, his various associations including Farrel-Birmingham from which he retired in 1943.

In the technical meeting W. T. Blake spoke on "Measuring the Processability of Elastomers under Typical Processing Conditions" and proposed the C. W. Brabender Plasti-Corder as an instrument for this purpose. The machine operates on the principle of a recording dynamometer. The dynamometer drives two rotors (similar to a Banbury) within the chamber of the temperature-controlled jacketed mixer-measuring head equipped for jacket and stock temperature measurement. In the measuring head the material is shear mixed, and the forces encountered as a result of this processing in miniature are transmitted through the torque dynamometer and a lever system to a recording strip chart and visual meter. This measuring and concurrent recording of the various viscous forces under typical processing conditions are an essential means of insuring ultimate product quality.

Surface Activity Of MgO as an Index

Surface activity as an index in selecting the proper type of magnesium oxide for some compounds was discussed by C. Sheets (Merck & Co.) at the fall meeting of the Buffalo Rubber Group. The meeting was held at the Hotel Westbrook, Buffalo, N. Y., October 10 and was attended by 95 people. After dinner, W. M. Alexander, of the FBI, spoke on "Activities and Functions of the FBI."

The basic difference in the two general types of magnesium oxide is in their purity and surface activity or rate of reaction with acid, according to Sheets. Heavy calcined magnesium oxide represents the inactive type. The active types are a necessary and important ingredient for many elastomers and usually function as an acid acceptor and a vulcanizing agent in rubber. Active magnesium oxide has a dual role, serving first as a retarder and then as a curative. It can also serve as a moderator of the curative system or as an ultra-violet screening agent.

The most important properties of magnesia for the rubber compounder are: ignition loss, impurities, particle size, and surface activity as defined by iodine absorption. Surface activity is a good index for predicting magnesium oxide performance in some compounds, but in others the performance can be affected by the type and amount of curatives, fillers, and other ingredients. In these latter cases it is necessary to evaluate two or more magnesium oxides of different characteristics.

Generally, the relation of surface activity of magnesium oxide to best overall performance in various elastomers is: neoprene, chlorobutyl, and SBR—high surface activity; fluoroelastomers—intermediate to low surface activity; Hypalon—low activity for optimum scorch protection; butyl—low activity for best ultra-violet reflection.

Urethane Elastomers Panel at Boston RG

Estane, Adiprene, and Texin urethane materials were discussed by a three-member panel at the fall meeting of the Boston Rubber Group held at the Somerset Hotel, Boston, Mass., on October 13 and attended by 200 members and guests.

H. Rex (Goodrich Chemical) discussed the physical and chemical properties of the semi-works materials, Estane 5740X-1, X-2, and X-7. The three are completely reacted thermoplastic elastomers with X-1 as an all-purpose material; the X-2 primarily for solution applications, but it can be molded and crosslinked with peroxides; and the X-7 which is recommended for molding. The materials can also be blended.

These Estanes can be reprocessed and

The Connecticut Rubber Group outing committee chairmen are shown from *left to right:* C. Larson (Wyrough & Loser), E. Schwartz (Southern Clay), F. Villa (Whitney-Blake), F. Browning (Cabot), H. Gordon (Bond Rubber), J. Mitchell (Seamless Rubber), and R. Ward (Du Pont)

have unlimited pot life. They show good resistance to freon and reportedly have the best gamma-radiation resistance of any elastomers. Rex listed some disadvantages, such as poor compression set under high pressure, heat buildup effects that increase abrasion loss, the need of ultra-violet light screening agents, and only fair electrical properties.

Rex also discussed injection and compression molding characteristics and covered the use of Multifex, Hi-Sil, and barium stearate as compounding ingredients. Suggested uses for Estanes included hose, fuel cells, wire and cable jackets, submarine cable covers, and adhesives. Other possible uses are sheet extrusions and surgeon's gloves.

M. L. Nadler (Du Pont) referred to three general types of urethanes: liquids, curable with amines and polyols; gums, curable with sulfur and peroxides; and solids, curable with heat. He discussed the properties of Adiprene (Types L-100, L-167, and L-315), including their resistance to heat, oil, and oxygen and also outlined compounding methods and materials.

He also covered the behavior of the Adiprenes in tension and compression, the hardness range and frictional resistance, and listed soft print rolls, seals, solid tires, heels, and impact fittings as typical commercial products.

K. Pigott (Mobay) opened with a history of urethanes and then discussed: first, the preparation of prepolymer from polyesters and diisocyanates; second, the reaction of prepolymer with chain extenders; and third, crosslinking. He pointed out that the hydrogen bonding links in the latter step were heat sensitive and told of methods of controlling crosslinking by the type of polyol used and by the use of additional isocyanates. He demonstrated that increased crosslinking gives higher tensiles and improves compression set. Unlike rubber, urethanes decrease in hardness with increased crosslinking.

He discussed the physical properties of the heat curable Texins (280A, 192A, and 355D), featuring their excellent oil-resistance. He stated that orientation of the polymers (curing under stress conditions) increases tensiles to values between 8,000 and 28,000 pounds and decreases elongation to 600-210%.

Connecticut RG Outing

The Connecticut Rubber Group held its sixteenth annual outing at Grassy Hill Park, Derby, Conn., on September 16, which was enjoyed by 212 members and guests.

The softball event was won by the team of A. DiMicco, K. Rich, C. Yackulics, A. Varshelka, W. Ekman, W. Daunis, H. Nallinger, V. Chadwick, all from Armstrong Rubber, with J. Petro and D. McNulty from Whitney-Blake. The runner-up team members were: A. Dazzo, G. Dirgo, P. Desankelle, D. Trednik—Goodrich; T. Kelly, P. Whitman — Vanderbilt; F. Palumbo, J. DeFillipo — Bond Rubber; W. Baulieu — Jenkins Valve; S. Lynch—Rome Cable. The single horseshoe event was won by A. Merritt, of Goodyear Chemical, and doubles by the team of F. Pennell and E. Warner, of Armstrong-Norwalk.

Winners of the golf tournament were: low gross — A. Murdoch, Jr. (Armstrong Rubber) and R. Stimets (United Carbon); low net—A. Merritt and J. Mickiewicz (Goodrich). The bocci event winners were W. Baulieu and E. York (Armstrong Rubber). First place in volley ball went to the Vanderbilt team of E. Mulcahy, H. Beadle, W. Cornel, R. Jack, and P. Whitman, with second place to the team of K. Rich, A. DiMicco, and C. Yackulics, all of Armstrong Rubber, with C. Holstein (Allied Chemical) and A. Hoge (Goodyear Chemical). In the egg-throwing event, T. Kelly (Vanderbilt) and V. Chadwick were the winners.

Ontario Group Outing

One hundred and eighty members and guests of the Ontario Rubber Group attended its fourteenth consecutive annual field day at the Dundas Valley Golf & Curling Club, Dundas, Ont., Canada, September 29. Bruce B. Austin, Firestone Tire & Rubber Co. of Canada, Ltd., was chairman of the golf committee.

Prize winners of the golf tournament were: first low gross, C. Pavanel, B. F. Goodrich Chemical Co.; first low net, Wilf. Grignon, Naugatuck Chemical;

(Continued on page 110)

The General Tire & Rubber Co., Akron, O., has added a White "Freightliner" double-trailer truck tractor to its Uvalde, Tex., fleet. The truck has a 12-speed transmission which permits speeds of 75 mph., positions for 18 test tires, and a tandem-drive axle with an inter-axle differential so that driving torque is distributed equally among the driving wheels. The extra trailer permits the testing of a greater number of truck tires at one time

washington report

By JOHN F. KING

Rubber Stockpile Is Subject of Congress, Agency Investigations

There must be something about property belonging to the government that compels an inquisitive interest from Congressmen and Senators. In the Army they used to say of property that if it didn't move, it should be painted; if it did, then it should be saluted. In Washington, the axiom is that if property has a government title, it should be investigated, continually if need be, sporadically if congressional interest is only casual.

So it is with the natural rubber stockpile. Once again it is to be investigated. The staff of House Government Operations Investigating Subcommittee is already doing the preliminary work, and its chairman, Rep. Porter Hardy (Dem., Va.), said if the findings warrant, the Subcommittee probably will undertake a full-fledged probe in the next session of Congress. Hardy and the Subcommittee's staff members are rather close-mouthed about the reasons for the most recent inquiry into government's handling of the estimated 1.2-million long-ton natural rubber hoard. Guarded though his comments are, however, it seems evident that the chairman is disturbed about the slowness of rubber stock disposal operations.

Disposal Moving Too Slowly

"The government's plan to dispose of 450,000 tons of stocked natural rubber over the next seven or eight years—a plan which I questioned when it came before the Armed Services Committee over a year ago — doesn't appear to function the way we thought it would," Hardy said.

He seemed to be voicing concern often heard both in Congress and in the rubber industry that the disposal plan moves too cautiously, that official concern about the possibility of breaking the rubber market by stockpile sales may be frustrating the goals of the disposal program.

"All we want to find out," Hardy explained, "is whether we're losing any money from deterioration of rubber in the stockpile."

The Hardy investigation, if it develops as it seems it will into a full-blown airing of what's going on in the rubber disposal program, will pyramid on top of at least two studies of the rubber stockpile now going forward in the executive branch.

Survey of Price Continues

The most recent of these is the interdepartmental review of rubber disposal pricing policy which, while really part of a continuing survey of stockpile sale operations, has become a critical investigation of the whole program as rubber prices have drifted downward in recent months. Kept extremely confidential to avoid panicking the market with rumors about possible stockpile policy changes, the interdepartmental investigators spent most of the summer wrestling with the question, whether to cut the price of natural sold from the stockpile. The 30c-a-pound floor set in the disposal price formula dampened interest in stockpile rubber when the market was down in June and July, holding total sales in those two months to less than 2,000 tons, 708 in June and 1,127 in July.

Before the interdepartmental committee had a chance to formalize and announce any price policy change, stockpile sales picked up and in August totaled 4,625 tons. But the monthly total slipped to 2,596 tons in September, and if sales keep on declining this fall, the heat will be on the Administration to resume consideration of a price cut. The initial probes of the Hardy subcommittee would serve as an additional goad.

New Commerce Review Set

The second Administration investigation of the stockpile is a little more technical, but still might be productive of overall policy changes. This is study by the "committee on interim review of rubber supply and requirements," headed by James H. Higgins, of the Commerce Department's Business & Defense Services Administration, which wants to know whether natural rubber reserves plus stocks of manufactured rubber products in government warehouses are sufficient to meet an emergency. (See RW, August, 1961, p. 95.) The object of this survey will be to prepare a new set of estimates on military and civilian requirements to determine overall emergency needs. It was just such a study in the Eisenhower Administration in 1958 which resulted in the current stockpile sale program.

Even though the sale program, since its inauguration in late 1959, has disposed of more than 100,000 tons of stocked rubber — the General Services Administration announced in October that it still has 342,275 long tons, including nearly 200,000 tons of prime smoked sheet, on hand to sell — Hardy and others in Congress appear to be dissatisfied with the slow sales pace.

In his investigation, Hardy said, he wants to determine "the status of stockpile sales, including the condition of the rubber and what prospect there is that we are getting a reasonable price for what we sell." If the findings are "serious enough," he went on, the investigating unit "will go into it fully." The staff report probably won't be finished until the end of the year, he added.

Working with the Hardy subcommittee staff as an expert consultant is R. D. Young, for 16 years president of The New York Rubber Trade Association, Inc. During the war he was an executive of the Rubber Reserve Corp.

Spokesmen for the executive agencies involved in the rubber sale program found it difficult to pinpoint what the Hardy investigation is aiming at. The agencies have been formally told that the probe is under way and have promised the Subcommittee their cooperation.

"But we still don't know what it's all about," said one official.

He added that it is possible Hardy is using the investigation to press his plans to use strategic materials in the stockpile, such as rubber, directly in the U. S. foreign aid program by giving aid-receiving nations commodities instead of the dollars with which to buy them —perhaps at higher prices—in the open market. The State Department is currently trying to work such a deal out with Turkey and a few other countries with rubber from the stockpile. Department officials report, however, that they aren't making too much headway.

Kennedy Ideas for 1962 Of Interest to Industry

President Kennedy is getting his forces lined up for the coming battle with Congress in the next session for a legislative program in which the rubber industry will have more than passing interest. With the "honeymoon" first year of the Administration now legislative history, the President will tangle next January with an increasingly conservative legislature over an even bolder program than he requested in the honeymoon session.

Controversy will swirl around four main plans in the Kennedy legislative program: a new international trade law, a tax reform bill, old-age medical care under the social security system, and, left over from this year, an aid-to-education program. It is with the first two that the rubber industry and business generally will be most concerned.

The President's trade program is being shaped now by Philadelphia banker Howard C. Peterson (see RW, August, 1961, p. 94), who is serving as part-time special assistant to draft a program that will replace the old reciprocal trade law which expires June 30 of next year. Even though even the roughest outlines of the plan were being kept secret in mid-October, all signs point to a radical new departure in United States tariff liberalization.

Tariff Policy May Change

It is known that nearly all the men surrounding the President have come to believe that an entirely new approach to tariff policy is required by the rapid development of Western Europe's economic bloc, the Common Market. If the U. S. is to coexist with the Common Market, they believe the United States must get in step with the European drive to freer trade. Specifically, as the current and potential new members of the Common Market such as Britain dismantle their national trade barriers in great chunks, so the U. S. must be prepared to match what they do. Thus if the United States is to maintain its foothold in the Common Market's expanding economy, it must be prepared to offer commensurate tariff concessions.

To do this, the traditional U. S. policy of reducing duties in exchange for foreign tariff concessions on an item-by-item, carefully limited and safeguarded "no-injury" approach must be jettisoned. What is needed in its place is new authority for the President to cut tariffs across-the-board—at least by major commodity groups—and cut them deeply. The details of how it should be done, along with the plans for selling the idea to Congress, are now being worked over by the Peterson task force. Its work should be completed by December 1.

Tax Proposals Slated

On taxes, the other main business bill the President will ask Congress to approve, the main outlines are already known, since the Treasury submitted its legislative proposals last session. Actually the Treasury plan now in the House Ways and Means Committee is the barebones' minimum tax bill the President wants. The Administration has a comprehensive tax reform program in the works, but that will not be sent to Congress until late in the next session. The hope is to get the overall program approved in 1963 or 1964.

In the meantime, however, the Administration will make a strong campaign for approval of the limited tax bill now on the docket. Its main provisions call for:

(1) Tightening up U. S. tax treatment of foreign operations of American firms. This is aimed at obvious tax avoidance schemes whereby U. S. companies set up subsidiaries in "tax haven" countries. It affects financial subsidiaries, such as those operated by insurance firms, more than it would manufacturing subsidiaries such as those of the U. S. rubber industry.

(2) Enactment of the investment tax credit. This provision, the carrot the Treasury has dangled from the tax reform stick, would allow industries to claim a tax credit of 7% or 8% of the value of new plant and equipment expenditures.

(3) Closing the "depreciation loophole" to eliminate windfall profits from the sale of depreciated property at a price exceeding the value at which it is carried on the owners' books.

(4) Ending the more flagrant abuse of businessman expense accounts, a self-explanatory item.

(5) Instituting the withholding tax on dividend and interest income, much the same as with salaries and wages.

In framing the overall Administration program, as well as mapping strategy for a tough campaign the President and his aides are well aware of the degree to which conservative thinking has become predominant in Congress, particularly in the House where the old Northern Republican-Southern Democrat coalition has reasserted its power. Specifically, they are acutely aware that three of the top four priority bills —trade, taxes, and medical care for the aged—must pass through the Ways and Means Committee in the House and the Finance Committee in the Senate, the strongholds of conservative power. Finally, the President realizes he will be working with a new House leader.

Celebration of Patent System Week

October 15-21 was American Patent System week, so proclaimed by President Kennedy to commemorate the 125th anniversary of the founding of the United States patent office as a separate agency. The event was celebrated October 18-20 by a program of Commerce Department-sponsored seminars on discussion of international as well as national aspects of patent systems. The meeting was attended by numerous foreign officials who have the responsibility for patent matters in their country.

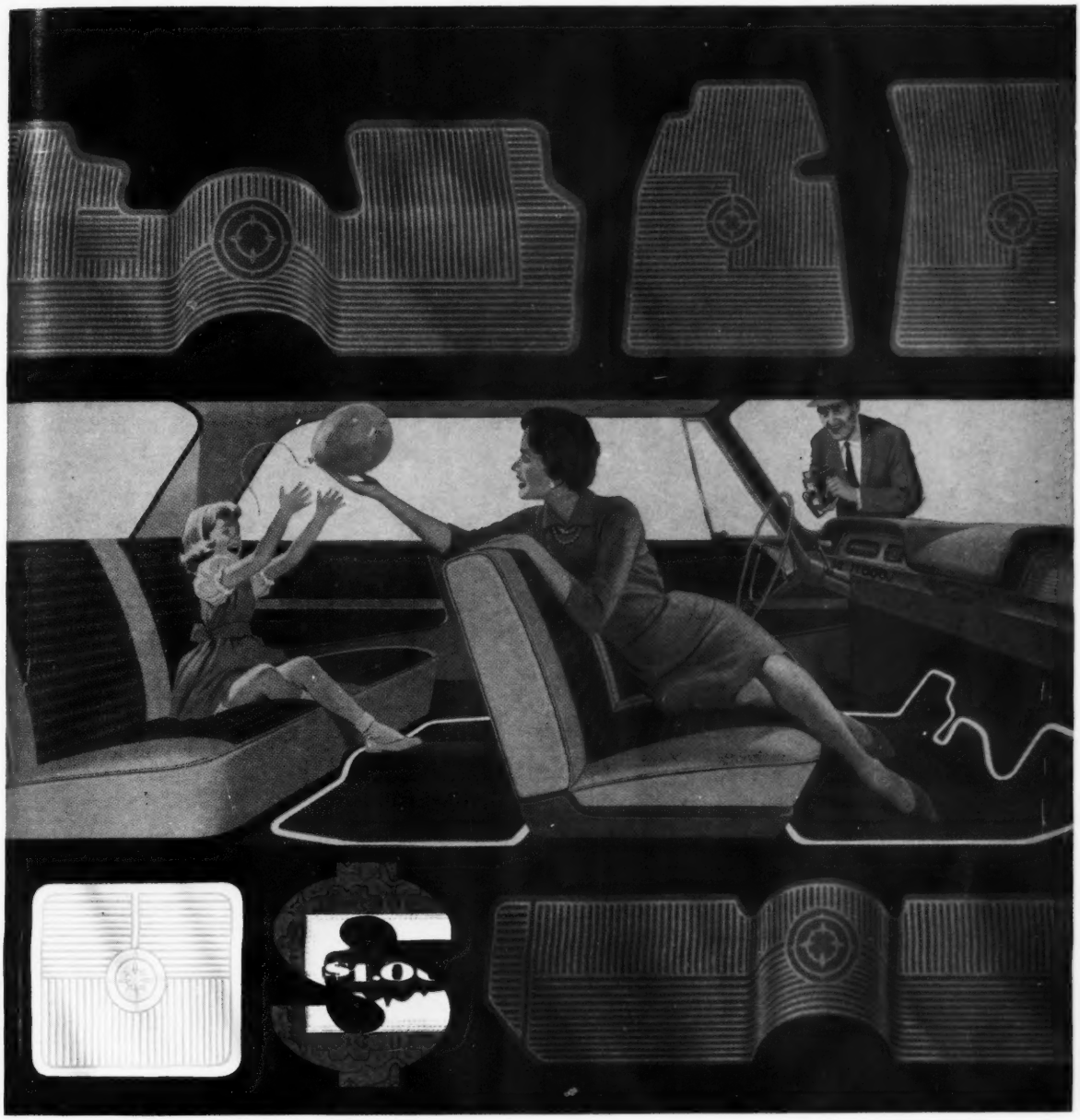
Vannevar Bush, noted educator, inventor, and scientist, headed a group of leading scientist-educators, lawyers, businessmen, and legislators who were members of the affair's sponsoring committee.

Tire Dealers Seek New Legislation

The National Tire Dealers & Retreaders Association wound up its forty-first annual convention early in October approving a number of resolutions, chief of which would bolster the market position of independent tire dealers by cracking down on direct selling by manufacturers.

The direct selling resolution was directed at the Senate Small Business Committee Antimonopoly subcommittee and took the form of an exhortation to the legislative group to publish a report on its June, 1959, hearings on direct selling practices which the independents believe bolster their case for corrective legislation. The subcommittee is believed to have prepared a report, but has not published it as a result of behind-the-scenes pulling and hauling between the interested business parties.

(Continued on page 101)



Ameripol Rubber pins costs to the mat In the highly competitive automotive floor mat business, Anchor Industries, Inc., Cleveland, Ohio, has solved the problem of producing a durable, attractive product at the lowest possible cost. Since switching to an Ameripol Rubber polymer, Anchor has reduced material costs over 10%. This major savings was made possible by Goodrich-Gulf's development of high oil-extended synthetic rubbers. You can take advantage of such continual improvements in synthetic rubber when you do business with Goodrich-Gulf. We produce the broadest range of rubber polymers, and offer complete technical service to help you meet exacting requirements. Contact Goodrich-Gulf Chemicals, Inc., 1717 East 9th Street, Cleveland 14, Ohio.

Ameripol
THE PREFERRED RUBBER

Goodrich-Gulf Chemicals, Inc.
WORLD'S LARGEST SOURCE OF SYNTHETIC RUBBER

NEWS FROM GOODRICH-GULF

5 AMERIPOL POLYMERS NOW AVAILABLE IN CRUMB FORM

Ameripol 1511, a cold polymerized type, is now available in crumb form. Including the hot polymerized types Ameripol 1006, 1009, 1012, and 1013, this now makes five polymers available both in bale or crumb form.

Crumb rubber is not compressed; thus retains the porous nature of the rubber particles as they are coagulated. The crumbs can be dissolved very easily in a suitable solvent since the solution speed is directly proportional to the amount of exposed area. In making products such as cement, where the rubber must be put into solution, use of crumb rubber saves considerable time and expense.

Ameripol crumb type polymers eliminate the need for milling and cutting or pelletizing equipment as part of a solution process. A simple agitated vessel can be used for dissolving the rubber. Packaging of the material is in rectangular cartons holding approximately 60 pounds.

Ameripol
THE PREFERRED RUBBER

ACCENT ON SERVICE SPEEDS BUTADIENE SHIPMENTS

These new barges, operated by Goodrich-Gulf on inland waterways, are believed to be the first designed specifically for butadiene service. Goodrich-Gulf has previously shipped butadiene by ocean barge to overseas customers.

This new transportation system will substantially improve service to butadiene customers in the Midwest. Leased storage facilities will increase inventory available to users.

In synthetic rubber, too, Goodrich-Gulf offers fast shipments from strategically located warehouse stocks in Chicago, Akron, Newark, and Neosho, Missouri; backed by giant plants in Institute, West Virginia, and Port Neches, Tex.

Most rubber product manufacturers are within a 24-hour delivery range of Ameripol stocks.

TYPICAL PHYSICAL PROPERTIES

(Based on test recipe of 150.5 parts masterbatch, 1.5 parts zinc oxide, 2.0 parts sulfur, 1.0 parts Benzothiazyldisulfide. Cure at 293°F.)

	Minutes Cured @293°F	Ameripol 4758	Ameripol 4772
Tensile, psi	50	3030	2980
Elongation, %	50	660	710
Modulus, 300%, psi	25	630	640
	50	1060	1050
	100	1380	1320
Hardness, Shore A	50	69	58
Compounded viscosity, ML4 @212°F		52	52

Goodrich-Gulf Chemicals, Inc.

1717 East Ninth Street • Cleveland 14, Ohio

Goodrich-Gulf offers widest range of styrene-Butadiene rubber polymers

AMERIPOL TYPES AVAILABLE

Hot polymerized types: 1000, 1001, 1002, 1006, 1007, 1009, 1011, 1012, 1013

Cold polymerized oil-extended types: 1703, 1705, 1707, 1708, 1710, 1712, 4700

Cold polymerized types: 1500, 1501, 1502, 1503, 1509, 1511, 4604

Cold polymerized black masterbatch types: 1605, 1606, 1608, 1609, 1610, 4651, 4658

Cold polymerized black masterbatch oil-extended types: 1805, 1808, 1809, 1816, 4756, 4758, 4759, 4760, 4771, 4772

Forms available: Pressed rubber bales, crumb rubber. Packaging to suit requirements.

Goodrich-Gulf Chemicals, Inc.

1717 EAST NINTH STREET • CLEVELAND 14, OHIO

industry news

Union Carbide Buys Price Patent Rights

The General Tire & Rubber Co., Akron, O., has signed a license agreement with Union Carbide Chemicals Co., division of Union Carbide Corp., New York, N. Y., granting the latter the non-exclusive right to manufacture, use, and sell certain polyurethane products covered by United States patent No. 2,866,774. The agreement also allows Union Carbide to extend to its customers immunity from suit under the licensed patent.

"Carbide decided to enter into the agreement at this time to assure continuing growth of the urethane foam industry," said John A. Field, vice president of the company.

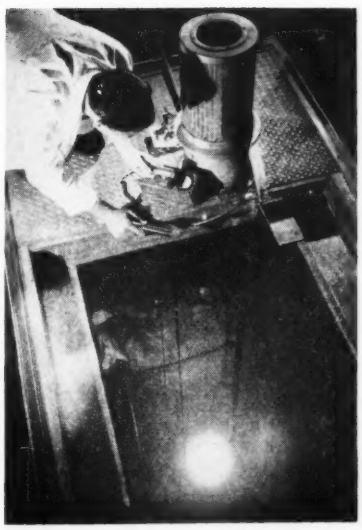
The patent concerned was granted to the University of Notre Dame in 1958 to cover the invention of a foam system by Dr. Charles C. Price, then head of the Notre Dame chemistry department. Price's invention relates to urethane products made from polyethers which are adducts of alkylene oxides with polyhydric alcohols having less than seven carbon atoms and three to six hydroxyl groups. NIAX triols supplied by Union Carbide for foam manufacture are of the type recommended by Price in his patent.

Under terms of a research agreement between Notre Dame and General Tire, General was granted exclusive rights under the Price patent, which allowed it to sign the license agreement with Union Carbide; both the University and Dr. Price will share in the payment gained by General from sale of the rights. General reported that licenses have been offered to other firms in the urethane industry under the patent.

The Price patent is currently involved in interference proceedings with Mobay Chemical Co., Pittsburgh, Pa. There has been considerable uncertainty in the urethane foam industry about the ultimate outcome of these proceedings and concern among foam producers about possible royalty liabilities.

Goodyear Steps Up Radiation Research

The Goodyear Tire & Rubber Co., Akron, O., has tripled its supply of radioactive Cobalt-60, accelerating its program (begun in 1956) to explore the effects of nuclear energy on rubber and plastics. The new 11,000-curie supply of cobalt slugs was activated in the NRU reactor of the Atomic Energy of Canada, Ltd., Chalk River, Ont., which is one of the most powerful nuclear reactors in the world.



Goodyear's cobalt is housed at the bottom of a concrete and aluminum-lined well under a 17-foot protective layer of water. When in use, the cobalt is raised by a remote controlled elevator. Above, nuclear scientist T. C. Gregson double-checks against radiation traces

H. J. Osterhof, director or research, said the firm has set a four-fold goal for its intensified radiation research program.

(1) To perfect methods of vulcanizing rubber by radiation, the first basically new vulcanizing method since Charles Goodyear's discovery of the sulfur and heat process in 1839.

(2) To use radiation as a polymerization catalyst, creating entirely new types of rubbers and plastics.

(3) To develop rubber compounds not easily damaged by intense radiation, for use in highly radioactive environments.

(4) To test space projects, such as an experimental manned space station built for NASA by the subsidiary Goodyear Aircraft Corp., Akron. In space, the station would be bombarded by cosmic rays similar in effect to the gamma rays emitted by cobalt, making it essential to know previous to its projection into space what effect radiation will have upon its construction.

FMC Is Entering Isocyanate Industry

FMC Corp. (formerly Food Machinery & Chemical Corp.) New York, N. Y., will build a new multimillion-dollar plant to produce toluene diisocyanate, a major component of polyurethane plastics. Paul L. Davies, chairman and chief executive officer of the company, stated that the company is exploring the possibility of forming a partnership in connection with this new venture.

The plant will be built on the site of the former Naval Ordnance plant in Charleston, W. Va., adjoining the company's chlorine-caustic plant which will provide a substantial portion of the raw materials needed for production of the new chemical. Construction of the toluene diisocyanate facility will start early next spring, with initial operation scheduled for late 1963.

Maurer Retires From Taylor Instrument

Henry W. Maurer, vice president, general sales manager, and director of Taylor Instrument Co. (Ohio), Inc., Akron, O., subsidiary of Taylor Instrument Cos., Rochester, N. Y., is retiring after 50 years of service to the company. Maurer joined Taylor, manufacturer of industrial measuring and recording instruments, in 1911, was made district manager in New England in 1914, and district manager of the Cleveland area in 1921. He was appointed to his present positions in Akron in 1956 when Taylor acquired the Ohio subsidiary. Born in Brooklyn, N. Y., in 1893, Maurer attended Kentucky University and is a member of the Akron City Club, the Elks, and the Masonic Orders.

John M. Bierer receiving a plaque commemorating his 50 years of contributions to the rubber industry from M. J. Bernstein *(left)* and James N. Mason *(right)*

Boston Woven Hose Honors John Bierer

Fifty years of outstanding service to the rubber industry were noted and reviewed at a testimonial dinner honoring John M. Bierer held at the Harvard Faculty Club, Cambridge, Mass., on October 5.

A group of Boston Woven Hose & Rubber Division and parent company American Biltrite Rubber Co. executives along with many friends recalled, during the evening, the many contributions Mr. Bierer has made to the industry.

Mr. Bierer started his career with Boston Woven Hose in 1911 as a chemist and progressed through various positions until named president in March, 1951. He served as a director from 1932 until the company was merged with American Biltrite in April, 1957. He currently serves as a consultant on Rotocure matters.

Some of the most notable achievements Mr. Bierer has made include his work on oxygen aging tests which led to the Bierer-Davis test, work on the manufacture of crimson antimony, publication of specifications for rubber goods, promotion of the economical use of reclaimed rubber as a substitute for new rubber, and his development of continuous vulcanization of rubber belting, 1939, and of flooring, 1949.

A plaque commemorating his service was presented to Mr. Bierer by Maurice J. Bernstein, president of American Biltrite Rubber Co., and James N. Mason, president of the Boston Woven Hose & Rubber Division.

Special Mattress for Fallout Shelter Use

The Balyeat Co., Mansfield, O., has introduced a mattress specially designed for use in family fallout shelters. It is said to be waterproof, mold and mildew resistant, and easily kept free of bacteria and dirt.

The core of the 11-pound, 30- by 74-inch mattress is made of three-inch thick Firestone polyether foam, in extra-firm density to provide adequate comfort when used directly on the floor or on a solid-base bed. Coated with neoprene and "Hypalon," the cover is waterproof, soil-resistant, and washable. In order to eliminate any loose surface areas, buttons, or raised seams where dirt collects and bacteria could lodge, the cover has been laminated directly to the polyether core, and the seams have been cemented at sides and ends.

The color is light turquoise, which is supposed to have a soothing effect, certainly desirable under the circumstances. It costs only $39.50 and will probably last a lifetime.

GG Expands SBR Capacity

Goodrich - Gulf Chemicals, Inc., Cleveland, O., will increase cold SBR production capacity by about 8% at its Institute, W. Va., plant. The expansion, which includes addition of polymerization reactors and related equipment, will chiefly provide for more production of light-colored, non-staining types of rubber. The company anticipates completion of the work by the end of the year.

Silicone Compound Standardization

Plastic & Rubber Products Co., Los Angeles, Calif., has introduced a new silicone compound standardization system which effects stocking, ordering, and servicing economy and efficiency. MIL-R-5847D calls for five classes and 24 subordinate grade compounds. Plastic & Rubber's standardization permits each of the five class compounds to fulfill 21 of the subordinate grade compound requirements. The 300% reduction in inventory also enables purchasers to realize quantity discount savings.

Montecatini's First U. S. Plant Opened

Montecatini Corp., Milan, Italy, and its American subsidiary, Novamont Corp., New York, N. Y., have announced that their polypropylene plant in Neal, W. Va., has officially gone on stream. The new plant can produce 30 million pounds annually of isotactic polypropylene for plastic applications.

Novamont plans to build another plant on the same site in 1962, to manufacture the company's Moplefane films from isotactic polypropylene resins produced at the Neal plant. Capacity is expected to be more than one million pounds per month.

Rubber Couplings For Tugboat Engines

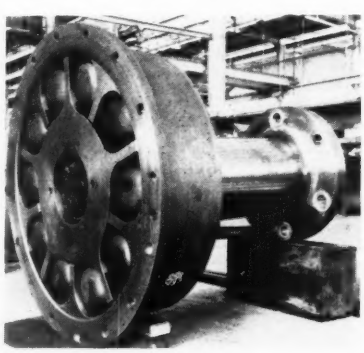
Power transmitted through rubber blocks will drive two of the most powerful tugboats ever to operate in the Persian Gulf and help make them the most maneuverable vessels of their kind, reports Koppers Co., Inc., Pittsburgh, Pa., manufacturer of the rubber couplings. The propulsion equipment for the tugs is being built at General Metals Corp.'s Enterprise plant, Oakland, Calif., and includes a Kopper Holset resilient coupling which, because it transmits power through rubber blocks, curbs the torsional vibration which often limits tugboat operations.

Usually in reduction-geared tugs the idling speed is comparatively high. These tugs, however, are required to operate at very low idling speeds in order to hold the huge oil tankers in place or ease them gently into tight berths. The only way these idling speeds could be attained was to include a coupling of very high torsional flexibility.

The Koppers Holset tardem rubber couplings shift the critical point of vibration down below idling speed and below the point where gears will rattle. They are designed with an outer sleeve (see illustration) that has blades extending inward, and an inner hub with blades extending outward. Between the blades are spaces into which are compressed 20 cylindrical blocks of specially formulated rubber.

When the inner member turns, its blades press on the rubber blocks which

(Continued on page 101)



A portion of one of the Holset resilient couplings shows the rubber blocks though which power is transmitted. Each cylindrical block of rubber is 6 13/16 inches in diameter and 10 7/16 inches long

news briefs

J. M. HUBER CORP., New York, N. Y., is increasing the capacity of its chemicals plant at Havre de Grace, Md. Construction will provide for additional production of Huber's unique sodium aluminate, "Zeolex[R]," and for a new Huber product, an improved hydrated silicic acid pigment. Production from the new facilities is expected about mid-1962.

CHEMORE CORP., general representative in the U. S. for Montecatini Soc. Gen., Milan, Italy, and NOVAMONT CORP., Montecatini's wholly owned manufacturing subsidiary, have moved to larger quarters at 100 E. 42nd St., New York, N. Y. Novamont's first plant, scheduled to produce Moplen polypropylene resin, will come on stream later this month at Neal, W. Va.

JOMAC INC., Philadelphia, Pa., has purchased the stock and assets of National Roller Co., New York, N. Y., manufacturer of printing rollers and industrial rolls. The acquisition will continue to operate as a separate company, and former employes have been retained. H. Howard Colehower III has been appointed interim manager.

NEVILLE CHEMICAL CO., Pittsburgh, Pa., producer of hydrocarbon resins, solvents, and plasticizers, has acquired a new subsidiary, Western Organic, Inc., Santa Fe Springs, Calif., manufacturer of chlorinated paraffins, paradichlorobenzene, orthodichlorobenzene, hydrocloric acid, etc.

CAREY - CANADIAN MINES, LTD., Cincinnati, O., has appointed A. E. Fleming Co., Detroit, Mich., asbestos fiber distributor in Michigan and northwestern Ohio.

WHEELABRATOR CORP., Mishawaka, Ind., has acquired W. W. Criswell Co., Inc., Riverton, N. J., manufacturer of filtration products. The company will continue to operate under present management.

INDUSTRIAL RAYON CO., division of Midland-Ross Corp., Cleveland, O., has transferred its purchasing and traffic departments from Cleveland to Painesville, O.

A. R. Paulsen *(right)* president, Hercules Equipment & Rubber Co., San Francisco, Calif., receives plaque commemorating the firm's 40 years of distributorship for B. F. Goodrich industrial products from J. W. Keener, BFG president

THE RICHARDSON CO., Melrose Park, Ill., plans to relocate its entire Melrose Park manufacturing facilities to other plants, in order to reduce costs and improve efficiency. Plastic laminated materials and fabricated and molded parts will be manufactured in a new plant to be constructed in north-central Illinois; while the manufacture of battery parts will be distributed among several existing Richardson plants. The company's executive offices and its centralized administrative, technical, research, and development activities will continue in Melrose Park.

THE SPRINGDAY CO., Springfield, Mo., a susidiary of Dayco Corp., Dayton, O., has commissioned Johnson Construction Co. to build a 52,800-square-foot addition to its plant, making Springday the largest V-belt manufacturing outfit in the industry.

U. S. RUBBER RECLAIMING CO., INC., Buffalo, N. Y., has appointed Comstock & Co., Buffalo advertising agency, its advertising counsel.

GOODYEAR TIRE & RUBBER CO., chemical division, New York district, has moved to 454 William St., East Orange, N. J.

WALLACE & TIERNAN, INC., Lucidol Division, opened its new research center in Buffalo, N.Y., October 20. The principal address was given by Dr. Clifford C. Furnas, Chancellor of the University of Buffalo. The three-quarter-million-dollar building houses five laboratory sections, including analytical research, applications research, new products research, product and process development, technical service and quality control.

Lucidol Division research center which recently was opened at Buffalo, N. Y.

news about people

A. L. McMullen

W. J. Hood

A. L. McMullen has been elected vice president and general manager of Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont. McMullen assumes the general operating duties of the president, **W. Horace Mason,** who was recently appointed vice president and treasurer of the parent Seiberling organization in Akron, but who continues as president of the Canadian subsidiary.

Gale V. Davisson, a foreman in The B. F. Goodrich Co.'s Akron, O., tire plant since 1944, has been sent to Iran to train employes for the company's Iranian subsidiary.

H. G. Heedy has been appointed assistant general manager, rayon staple fiber, for American Enka Corp., New York, N. Y. **M. F. Wesenhagen** was named assistant general manager, rayon filament.

E. F. Grandstaff has been appointed regional sales manager of the Europe-Africa-Middle Eastern division of The General Tire & Rubber Export Co., Akron, O., replacing **R. C. Deal,** who has resigned. **William E. Moran** will assume Grandstaff's former position as sales supervisor for the European division Both men will handle their new duties from Akron.

H. Richard Sherburne and **Arthur W. Wilson** have been appointed district sales managers for two newly established sales offices of Pittsburgh Plate Glass Co., chemical division, Pittsburgh, Pa. Sherburne will locate at the Los Angeles, Calif., office, and Wilson at Portland, Ore. **Donald A. Huff** was assigned to the San Francisco, Calif., office, succeeding former district sales manager **O. W. Andrews.**

Walter J. Hood has been made a sales engineer on the technical sales staff of Paul O. Abbé, Inc., Little Falls, N. J.

Martin H. Schneider has been appointed technical sales representative at Marbon Chemical Division, Borg-Warner Corp., Washington, W. Va. He will be responsible for a 21 central state area with headquarters in Chicago, Ill.

William C. Klann, Jr., has been named plant manager at Johnson Plastic Corp., Chagrin Falls, O. He will supervise and coordinate all production, engineering, and research activities and related operations.

Samuel W. McCune III, deputy managing director of Du Pont Co. (United Kingdom), Ltd., has been elevated to managing director. McCune succeeds **William H. McCoy,** who returns to the United States on special assignment with the parent company in Wilmington, Del.

Frits Prakke, vice president of American Enka Corp., New York, N. Y., has been given the additional responsibility of the general managership of the rayon division. **Claude S. Ramsey, Jr.,** formerly rayon division general manager, is now general manager of the nylon division.

Glenn A. Mellinger has been promoted to general sales manager of The Ohio Rubber Co., a division of Eagle-Picher Co., Willoughby, O. **Edward J. Amann** has been made chief chemist of the company.

G. A. Mellinger

Photo-Art Studio

E. J. Amann

M. H. Schneider

R. W. Pickles

R. W. Pickles has been named greater New York City and Upper State New York representative for Fife Mfg. Co., Oklahoma City, Okla., manufacturer of automatic web and cloth guiding equipment. He will headquarter at Basking Ridge, N. J.

Douglas Simpson has become manager, marketing and product research, at Canada Wire & Cable Co., Ltd., Toronto, Ont., Canada.

F. J. Kavanagh has been appointed manager of sales promotion for Dominion Rubber Co., Ltd., Montreal, P.Q., Canada.

John McKinlay, manager of northeast district, has been advanced to assistant manager, eastern sales region, covering the sale of industrial rubber products and mechanical packings for Raybestos - Manhattan, Inc., Passaic, N. J.

Erich M. Selzer has been appointed to the new post of sales director for Dayco Rubber International, a division of Dayco Corp., Dayton, O.

Allen W. Stoner has been appointed manager of the synthetic fiber research department at the Wayne, N. J., research center of United States Rubber Co., New York, N. Y., succeeding **Clide I. Carr,** who has been transferred to a similar position as manager of the elastomers research department. In his new position, Dr. Stoner will be responsible for the chemistry and physics problems in the design, manufacture, and use of man-made fibers.

F. Barlow

C. Vill, Jr.

Fred Barlow has been named supervisor of the United Carbon Co. service laboratory in Akron, O. His activities include planning, programming, directing, and reporting technical service projects conducted for customers at the laboratory.

O. W. Andrews has been elected to the newly created position of director, marketing services for the chemical division of Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Donald F. Moulton has been named technical service representative in Vermont for Oakite Products, Inc., New York, N. Y., manufacturer of industrial cleaning and metal treating compounds.

Bjorn F. Benson has been named manager of tire technical service for Allied Chemical's National Aniline Division fiber marketing department, Akron, O.

J. R. Lakin has been named vice president, marketing, of B. F. Goodrich Tire Co., division of The B. F. Goodrich Co., Akron, O.

Sam W. Leonard has been named controller and secretary of the new Petroquimica Argentina, S. A. (PASA), which is planning construction of a plant in San Lorenzo, Argentina.

Alfred J. George has been appointed technical sales representative in the northern Illinois, Indiana, and Michigan territory for the industrial adhesives division of Hadley Bros.-Uhl Co., St. Louis, Mo.

Julio J. Usera has joined the recently formed international division of Hooker Chemical Corp., New York, N. Y., as director of sales.

E. L. Davis and **John W. Messner** have been named technical service representatives in the Akron, O., service laboratory of United Carbon Co., Houston, Tex.

Ronald H. Miller has been made assistant to the general sales manager, Columbian Carbon Co., New York, N. Y.

Carl Vill, Jr., has been assigned to the sales staff of the rubber chemicals department of American Cyanamid Co., Bound Brook, N. J. He will headquarter in the department's Akron, O., office, and will service customers in parts of Ohio, Indiana, Tennessee, and Alabama.

Clarence H. Sigler, Jr., has been appointed to the new post of Vibrathane polyurethane and Vibrin polyester commodity manager for Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

Robert C. Deal has been named manager of the Seiberling Rubber Co. export division, Akron, O., replacing **Claude Pitts,** who will continue his association with the company as an export consultant.

Rod Morris will represent Stillman Rubber Co., Culver City, Calif., manufacturer of metal and rubber seals and gaskets, as sales engineer in the Atlanta, Ga., area.

Edward H. Coale, formerly sales and marketing vice president of Seabrook Farms, has been named general sales manager of the consumer products division of The B. F. Goodrich Co., Akron, O. He will headquarter in New York, N. Y.

Pach Bros., N. Y.

S. W. Leonard

E. H. Coale

E. L. Davis

J. W. Messner

R. H. Miller

R. J. Pikna

Raymond J. Pikna was made factory manager at the new synthetic rubber plant, Port Jerome, France, of The Firestone Tire & Rubber Co., Akron, O. **Charles H. Hammond** becomes production manager of the plant.

Jerry Lee Masters has joined the sales department of Colonial Rubber Co., Ravenna, O.

Robert E. Hugus has been appointed vice president, in charge of production, for Davidson Rubber Co., Dover, N. H.

Rubber Couplings

(*Continued from page 98*)

tend to assume the dimensions and shape of the cavities in which they work. Alternate rubber blocks flex, exerting pressure on the blades of the outer member. Only under conditions of extreme overload do the rubber blocks completely fill the cavities. In this manner, the rubber blocks dampen the torsional vibration.

No lubrication is necessary, says the company, and the couplings are maintenance free.

Tire Dealers

(*Continued from page 92*)

Therefore, NTDRA urged it in a formal convention resolution to "make every effort to publish a report" on the hearings and "recommend to the next session of Congress such corrective legislation as the subcommittee feels is required to meet the problem developed at these public hearings."

Other resolutions included an appeal to the Internal Revenue Service to apply the excise tax on tread rubber used on a tire and not that portion of camelback which is lost during the retreading process. The Association also appealed in another resolution directed at both IRS and Congress to "correct this area of unfair competition" created by regulations that new tires must be advertised at retail prices which include the excise tax.

international picture

Kaiser Alerts West German Rubber Industry

The upsurge of the West German economy is not likely to continue at the tempestuous rate of recent years, F. W. Kaiser, chairman of the board of the Economic Association of the German Rubber Industry, warned members at a meeting held June 24 in Baden-Baden. He said the change must be expected both because of consumer trends within Germany and increased international competition.

Rubber consumption by the West German rubber industry reached an all-time high of 254,000 tons in 1960, topping the previous year's record by 15%. Indications for 1961 show, however, that the increase over 1960 consumption will be only about 4%.

About two-thirds of the total German rubber consumption is accounted for by the automobile industry. Production of motor vehicles has doubled in the past five years, and by the end of 1961 there should be 5,400,000 units, or one car for every nine persons in West Germany. Further expansion is expected by some, but Kaiser does not believe the trend will continue at such a rapid rate. He feels that such factors as road congestion will discourage many prospective automobile purchasers.

Turning to the problem of growing foreign competition, Kaiser pointed out that 1960 rubber imports in Germany were up 25% by volume and 43% by value over 1959 figures, with rubber-soled canvas footwear, tires, certain types of hose and belting, bathing caps, dipped rubber goods, and storage battery cases figuring most prominently. He felt that Britain's proposed entry into the Common Market could have serious results for German rubber manufacturers, who do 90% of their export trade with Common Market partners. On the other hand, the other members of the European Free Trade Area may follow Britain's example in joining the Common Market, and a fusion of the two economic groups is welcome from a political standpoint.

An additional problem is posed by the difference in the French and German internal taxation systems. While the Inter-Common Market import duties on, for instance, automobile tires, are almost the same (13% of the value in West Germany and 14.3% in France), the turnover tax on these goods in Germany is only a fraction of the French added value tax. Also, the foreign exchange differential of 7.8% works in favor of the French exporter to Germany. Kaiser suggested that Germany adopt the basic principles of the French system.

Other international trade trends to watch, said Kaiser, are the new large economic groups being formed in Russia and Latin America, and the efforts toward similar economic association between Canada and the United States.

Huls Ups Capacity For Synthetic Rubber

Bunawerke Hüls GmbH (BWH), the most important subsidiary of Chemische Werke Hüls, has increased its annual production capacity for synthetic rubber to 120,000 tons to meet rising demand. In 1960, Bunawerke Hüls produced 71,000 metric tons of all grades of Buna (SBR) Hüls. The company today manufactures seven standard and eight special grades of solid rubber, as well as several grades of latex and carbon black rubber.

Consumption of synthetic rubber has continued to rise in West Germany, as it has in all major industrial countries, and now stands at about 45% (compared to about 70% in the U. S.). All tire treads in Germany are made exclusively of synthetic rubber, and Hüls is now supplying tire manufacturers extensively with synthetics for sidewalls as well.

The development of oil-extended rubbers in Germany, largely by Hüls, has made it considerably easier, said Hüls, for tire companies to produce the new "round-shouldered" type of tire. The tire is designed with a tread rib extending partially around to the wall of the tire, in contrast to the conventional flat tread. Manufacturers of the new type of tire state that it exhibits superior mileage, shock absorption, and traction and shows a high degree of skid resistance.

West Germans Hold Polymer Conference

Among the many papers presented at the 1961 Macromolecular Conference in Freiburg/Breisgau, held to honor Prof. Staudinger on the occasion of his eightieth birthday, was a series on the synthesis and properties of copolymers. H. Bartl, Leverkusen, described interesting polymers obtained when ethylene and vinyl acetate were copolymerized in solvents in the homogeneous phase and under pressure of 300-400 atm. The polymers in which the proportion of ethylene predominates show very good tensile and elongation values; copolymers containing 30-50% vinyl acetate have rubber-like properties and can be crosslinked with sulfur or by peroxides to rubber-like products.

Hj. Sinn and coworkers, Munich, found that polymerization of styrene, isoprene, butadiene, dimethyl butadiene, and vinyl ether can be activated by alkyl aluminum chloride only in the presence of minute quantities of proton-active substances such as water or HCl. This was also found to be the case with Ziegler-type mixed catalysts such as aluminum trialkyls and titanium tetrachloride or alkyl aluminum dichloride and cobalt-2-chloride.

Natta Receives International Award

Giulio Natta, of Milan, Italy, has been awarded the First International Synthetic Rubber Gold Medal, presented by *The Rubber & Plastics Age* for his work on the structure and properties of synthetic polymers. Awarded by an international panel representing the rubber industries of Great Britain, U. S. A., France, Germany, and Holland, the medal was presented to Natta at a rubber industry dinner in London, England, October 31.

Polish Chemical Industry Advances

Poland's chemical industry has expanded considerably in recent years, particularly in the organic field. The center of these activities is the Chemical Combine at Oswiecim, which produces various organic materials based on acetylene, including PVC. The combine has been making polystyrene and synthetic rubber since 1959. According to available figures, Poland's output of synthetic rubber has risen from 11,000 tons in 1959 to 20,000 tons in 1960.

As part of the current industrial program, organic materials based on natural gas are to be made in Tarnow, and oil-based materials including polyethylene, polypropylene, and synthetic rubber will be produced at a complex to be built in the Plock area.

British Rubber Firms Have Long Labor Peace

The American rubber industry's management and labor must read with a wistful sigh the remarkable story of the just-celebrated 21 years of labor peace in Britain's rubber industry.

In contrast to the U. S. industry's mottled record of long shutdowns resulting from labor disputes over recent years, British rubber management and labor have gone without an official dispute of any kind since before the war, thanks to the National Joint Industrial Council for the Rubber Manufacturing Industry.

According to a British Government anniversary announcement, the Council, created September 26, 1940, just as World War II was getting started, has managed to preserve harmony through a procedure of consultation and negotiation agreed on by Britain's 150 rubber firms and 100,000 rubber workers who produce nearly 30 million tires a year now. Like the 200 other industrial joint councils in Britain, the rubber group deals with a wide range of subjects affecting the industry's interests as a whole.

Laborite Reg Davis, head of Britain's 1.3-million-man Transport and General Workers' Union, now is chairman of the rubber industry's joint council. The chairmanship alternates annually between the "bosses' man" and the "workers' man," and Davis's vice chairman now is F. I. Tuckwell, Dunlop Rubber executive.

In complimentary language almost never heard between U. S. industry and labor, Davis says Britain's rubber industry, which specializes in auto and bike tires, industrial belting, flooring, and hose piping, contains "many very enlightened employers in the industry. Taken as a group, they are ahead of most industries."

Repaying the compliment, Tuckwell praises the "utmost cooperation from the unions" as the industry has expanded since the war. Both men concede that there have been some unofficial disputes, but these have not been such as to cause many lost workdays. The industry's record as a whole in this regard is well below the national average.

Malayan Smallholders Replanting Plans Lag

The total area replanted and new planted by Malayan smallholders through 1960 came to 405,370 acres, out of a total area of 1,500,000 acres of smallholdings, Chief Replanting Officer J. Fairweather reveals in his 1960 report on replanting under the government scheme. There are still thousands of lagging smallholders, and the Federation has undertaken a big drive, showing the advantages of the scheme, in an effort to get them to join it. The extent of the task facing the replanting officers engaged in this propaganda work may be illustrated by the example of the single State of Perak. Here smallholdings covering about 310,000 acres are owned by no fewer than 88,321 smallholders. A total of 66,380 acres, held by 18,000 smallholders, had been replanted by the end of 1960, whereas the target had been 85,110 acres by the end of 1959.

There are a number of "hardcore" smallholders who refuse to make an effort to replant their old rubber; publicity and propaganda have no effect on them. Mr. Fairweather has suggested that compulsory replanting, in their own interest, might solve the problem of such smallholders.

Mr. Fairweather revealed that in the last two years large group replanting and new planting had been made possible by the employment of agricultural contractors who have the necessary equipment for mechanical felling of trees and general preparation of rubber lands for planting and who are ready to take on such operations at competitive rates.

Pirelli Builds Tire Plant in Sicily

Pirelli, SpA., Milano, Italy, which opened one new tire plant last year at Settimo Torinese, is opening another, a two-billion-lira factory in Messina, Sicily. The plant will utilize local labor resources and is expected to help eliminate the industrial gap still existing between northern and southern Italy.

In addition to the construction of the new Sicilian plant, Pirelli has improved equipment at its Tivoli plant and expanded and provided new specialized equipment for its Milan plant at Bicocca.

ACB Blacks Capacity Doubled Down Under

Australian Carbon Black, Pty. Ltd., (ACB) reports completion of a $1.2-million expansion program to double capacity of its plant in Altona, Victoria, Australia. ACB, a joint venture between United Carbon Co., Houston, Tex., and Cabot Corp., Boston, Mass., finished building the plant in 1960, at an initial capacity of 30 million pounds a year. The expansion boosts annual capacity to 60 million pounds of SRF, GPF, FEF, HAF, and ISAF carbon blacks. The expanded facility more than meets Australian consumption requirements, now 40 million pounds a year, reports Oscar G. Meyer, managing director of the firm.

Australia Eases Taxes on Exporters

In an attempt to assist and encourage manufacturers to maintain and even expand their exports, the Australian Government recently announced tax concessions which should benefit manufacturers of plastics and rubber products as well as other industries.

There will be a rebate on payroll tax for increased exports, which, depending on the rate of increase, may be enough to cancel out the whole payroll tax. In addition, a market development allowance will permit exporters to deduct £2 from assessable income for every £1 which they spend on export promotion.

In the fiscal year 1959/60, Australia exported plastics materials to a value of £1,500,000, in addition to a wide variety of plastics articles. In the same period, exports of rubber manufactures represented a value of nearly £1,000,000.

Soviet Helps Ceylon Build Tire Plant

The Soviet Government will assist Ceylon in building a tire factory, to occupy a site of 37 acres ten miles from Colombo. The plant will have an initial capacity of 250,000 tires annually; in a second stage production is to be raised to 360,000 tires; and in a third stage, to 600,000 tires. Twelve types of tires will be made, largely for buses, but standard sizes for cars will be included. Between 400 and 500 persons will be employed in the first stage of the project. Ceylon's present tire needs are put at 150,000 units, nearly all imported. By 1964, requirements are expected to be 250,000 units, all of which the local factory will supply.

Firestone to Make Tires in Japan

The Firestone Tire & Rubber Co., Akron, O., plans to produce tires in Osaka, Japan, in cooperation with the Ohtsu Rubber Industry Co., Ltd., Osaka. This move gives Firestone its fourth tire and tube production facility in the South Pacific and Eastern Hemisphere and its seventeenth overseas plant. Under the agreement signed between the two companies, Firestone will provide technical information and assistance and share its knowledge of new developments with Ohtsu. The latter expects to expand considerably in the next several years to take advantage of the growing Japanese tire market, which is largest in Asia, with 1,696,500 cars, trucks, and buses registered in the current year.

G-G Licenses Japanese Firm

Goodrich-Gulf Chemicals, Inc., Cleveland, O., has granted to the Japanese firm of Ube Industries, Inc., a license to manufacture, use, and sell its *cis*-polybutadiene and *cis*-polyisoprene synthetic rubbers. Goodrich-Gulf previously licensed Polymer Corp., Ltd., Sarnia, Ont., Canada, and Shell Chemical Co., Ltd., London, England. The company also announced that an agreement has been worked out to exchange information on these rubbers with Chemische Werke Huls, Marl, West Germany.

Ceylon's Replanting Scheme Progressing

The Ceylon Government initiated a rubber replanting program in 1953 to improve about 200,000 acres of land out of the total rubber area of 668,948 acres. According to the 1960 report of the Rubber Controller, 151,043 acres had been replanted to the end of that year. It is expected that by the completion of the program in 1962, Ceylon's rubber output will have increased by 60% over 1953 output.

PELLETIZED NEWS

Ways of utilizing the millions of tons of rubber wood that replanting leaves in its wake are being considered by authorities in the Federation of Malaya. Rubber wood has proved unsuitable for construction purposes and is usually burned. Last year the Forest Research Institute at Kepong reported tests in blending rubber wood pulp with other pulps for making paper. Now, it is learned, the Japan Consulting Institute, in Kuala Lumpur, is trying to manufacture hard-board from rubber wood. If these efforts prove successful, old rubber trees may become the basis of new local industries.

Malaya will use rubberized materials on all roads in the Federation, the Minister of Works, Posts & Telecommunication, Dato V. T. Sambanthanm, recently announced while referring to plans for the construction of new roads and improvements of existing national highways in the near future.

POLAND will build a tire factory at Olszstyn with British technical assistance, to have an annual capacity of 3,500,000 automobile and heavy-duty tires. The two factories already operating in Poland (Stomil, in Poznan, and Degum, in Debica) reportedly produced a total of 1,062,600 tires in 1959.

Wage talks between the Malayan Planting Industries Employers' Association and the National Union of Plantation Workers are evidently not progressing in accordance with the Union's hopes and aims. Five months after the Union submitted its new wage proposals, so little headway has apparently been made that the Union warned the MPIEA that it may decide to order a go-slow movement if discussions, scheduled for September 28, failed.

Stealing of rubber remains one of the biggest problems of estate management in Malaya. At a very conservative estimate, rubber valued at $100,000 (Straits) is stolen in the Federation every month.

THE WESTERN NIGERIAN MINISTRY of AGRICULTURE & NATURAL RESOURCES has intensified its activities aimed at increasing rubber production. Farmers will be able to buy high-yielding varieties at subsidized costs and will be given training in the correct way of tapping and the preparation of good rubber latex.

Rubber exports from Malaya during the first nine months of 1961 totaled 862,738 tons, 8% more than in the corresponding period of 1960. This increase is chiefly due to Russia's stepping up of purchases this year to almost four times the figure of last year, and whereby, incidentally, she has become Malaya's best customer for rubber, after Britain. Reports for October showed Russia was an especially heavy buyer of rubber on the Malayan market; her total off-take for the month was put at 30,000-35,000 tons. At that rate she was easily Malaya's best rubber customer. Rubber production during January-September, 1961, came to 478,405 tons, or 3½% above the figure for the same period in 1960.

THE ITALIAN MINISTRY OF INDUSTRY & COMMERCE has granted patent No. 623,391 to Nathan, Morton and Leonard Hack, covering the sole and wedge construction of the Ripple sole, originally patented in the United States by Ripple Sole Corp., Detroit, Mich.

(*Continued on page 110*)

Representatives of major United States firms met at the Chase International Investment Corp. to complete a purchase agreement for an $18.5-million portion of a $72-million Argentine petrochemical complex to be known as PASA, Petroquimica Argentina, S. A. The plant will be built in San Lorenzo, Argentina, and will supply Argentina's major needs for synthetic rubber, benzene, and chemical intermediates, now largely imported. Pictured above are: (*standing, left to right*) John G. McLean, financial vice president, Continental Oil Co.; David Rockefeller, president, Chase Manhattan Bank; Robert L. Garner, president, International Investment Corp.; Victor E. Rockhill, president, Chase International Investment Corp.; Andre Meyer, senior partner, Lazard Frerers & Co. (*Seated, left to right*) Harold G. Osborn, chairman of the board, PASA; Robert I. Wishnick, chairman of the board, Witco Chemical Co., Inc.; J. Ed Warren, president, Cities Service Co., Leonard F. McCollum, president, Continental Oil Co.; George R. Vila, president, U. S. Rubber Co.; R. D. Ricketts, president, Fish International Corp.

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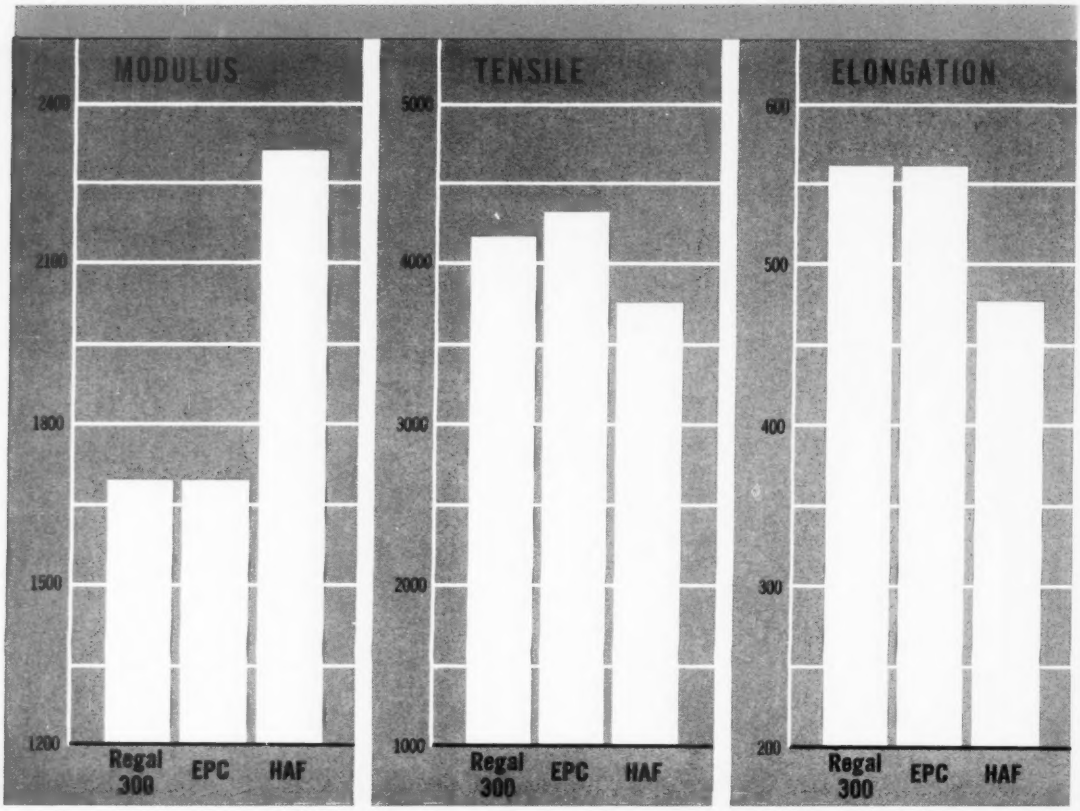

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Quality Battle Continues in Tire Cord War, with No Price Cuts in Prospect

Tire Cord

With rayon and nylon tire cord producers still competing by putting considerable research into the quality of their products, it begins to seem unlikely that any cuts in the price of the product will be forthcoming for at least the next six months.

The latest to announce an improved nylon tire cord is E. I. du Pont de Nemours & Co., Inc., who brought out a new tire cord yarn, Type 714, during October, with fatigue resistance claimed to be 25% better than that of any other tire cord on the market. Production of the new yarn required some modification of the production process, it was reported.

Last spring Chemstrand announced a nylon tire cord yarn with 100% better fatigue resistance than its previous yarn, and during the past few months both American Viscose Corp. and American Enka have introduced new rayon tire cord yarns about 15% stronger than previous yarns.

Prices of nylon and rayon yarns are not very far apart now, when the difference in the amount of yarn going into a tire is taken into account. For a four-ply passenger tire, 1.38 pounds of nylon cord is used, compared with 2.10 pounds of rayon cord. With the price of nylon cord 92¢ a pound, and that of rayon 57¢ a pound, this means a price of about $1.20 for the rayon cord in a tire, $1.27 for the nylon cord. For the two-ply passenger tire, less nylon is used, about 1.25 pounds, but the price per pound remains the same, giving a price of about $1.15 per tire. The rayon poundage remains the same for a two-ply tire, but the price of cord goes down to 47-51¢, for a total of 94¢ to $1.02 a tire.

This is a noticable difference in price, but probably not a great enough one to bring any great pressure for a price cut by nylon makers. As far as both passenger replacement tires and truck tires go, other factors such as safety outweigh a small difference in price. For trucks, such factors as recappability, treadwear, and tire running temperatures could easily make a greater difference in cost than the small gap in original price.

When it comes to original-equipment tires for passenger cars, the original cost factor is important. The nylon yarn manufacturers would undoubtedly be interested in cutting prices if by doing so they could capture the original-equipment market. However, a cut of about 5¢ a pound in the price of yarn or four-ply tires, and closer to 12¢ a pound for the yarn used in two-plies, would be necessary to meet the price of rayon yarn. It is doubtful they would be willing to come that far down.

In addition, nylon tires have the defect of flat spotting, which still seems an inherent part of nylon yarn. With nylon's added advantage of stronger yarn, about 9 grams per denier, compared with 5.6 grams for rayon, elimination of flat spotting might do more to capture passenger tire markets than any price cut.

These appear to be some of the reasons why nylon yarn makers are concentrating on quality at the moment, rather than price. This attitude, however, does not preclude a cut in prices when new nylon capacity is in full swing next year. A good deal depends on whether nylon yarn makers can during the last quarter of this year and the first half of next year continue their steady penetration into the replacement passenger and replacement and original-equipment truck tire markets.

Packaged production of high-tenacity rayon yarn during September was 20.9 million pounds, compared with 21.1 million for August. Domestic shipments were 21.4 million pounds, against 19.5 million in August, and total shipments, including exports, 23.4 million pounds, contrasted with 21.2 million in August. Stocks at the end of September fell to 17.8 million pounds, compared with 20.3 million pounds on August 31.

Interestingly enough, total shipments of high-tenacity yarn for the first nine months of the year were 184.4 million pounds, off 13% from the 211.3 million pounds of the similar period in 1960. At the same time, production of the regular-tenacity rayon yarn for non-tire uses was up 2% from output during the similar period of 1960.

RAYON PRICES

Tire Fabrics

1100/980/2	$0.69
1650/1500/2	.60

Tire Yarns

High-Tenacity	
1100/490	.57
1100/980	.57
1150/490,980	.56
1650/1100	.51
2200/1440	.48
3300/2200	.48

NYLON PRICES

Tire Yarns

840/140	.92
1680/280	.92

Synthetic Rubber

Figures for the first eight months of this year confirm what previous estimates had indicated, that the increase in synthetic rubber production abroad is cutting deeply into United States exports. As might have been expected, the drop in SBR exports is most striking.

U. S. consumption of synthetic rubber for the first eight months of 1961 was 692,964 long tons, a drop of 5.7% from the 735,324 long tons consumed during the same period last year.

Exports, on the other hand, declined to 196,309 long tons, contrasted with 248,771 long tons during the first eight months of last year. This was a drop of 21%, or nearly four times as great a percentage drop as that in domestic consumption. U. S. consumption, moreover, was cut by a recession, while European economies were booming.

U. S. consumption of SBR during the first eight months of this year was 569,348 long tons, off 14% from the 615,619 long tons used during the similar period of 1960.

Exports of SBR declined nearly twice as sharply. Exports were 144,833 long tons, compared with 189,578 long tons

in the first eight months of last year, a drop of 24%.

Domestic consumption of neoprene dropped off from 55,801 long tons through August of last year to 47,676 long tons in the first eight months of this year, a decrease of 15%; while exports were off from 34,792 to 27,380, a decrease of 21%.

Domestic consumption of nitrile rubbers increased over the 1960 eight-month period, from 21,308 long tons to 21,734 long tons. Exports also were up by about 2%, from 5,384 long tons to 5,484 long tons.

Butyl, however, followed the general trend. Domestic consumption dropped off from 43,713 long tons to 39,821 long tons, a decrease of about 10%. Exports were off much more sharply, from 19,017 long tons to 15,117 long tons, or about 21%.

The new factor in the picture since last year is the stereo rubbers. Domestic consumption of stereo and other elastomers during the first eight months of this year was 10,400 long tons, and exports were 3,495 long tons. The amount was so small during the first eight months of last year that it can be considered non-existent.

If the current trend continues, 1962 will see a continuing decline in exports, probably a drop in SBR production, and a great increase in consumption and export of stereo rubbers. If business picks up, consumption of neoprene, butyl, and nitrile rubbers should pick up also, especially since they are continuing to widen their markets.

Turning to short-term figures, consumption of new rubber in the U. S. during August increased to 136,740 long tons, contrasted with 108,377 long tons in July, the Rubber Manufacturers Association, Inc., reported.

Consumption of all types of synthetic rubber in August totaled 98,575 long tons, compared with 78,358 long tons in July.

The percentage of synthetic rubber to total new rubber consumption was off slightly, 72.1%, against 72.3% in July. Synthetic rubber accounted for 71.63% of all new rubber consumption during the first eight months of the year, compared with 68.54% for the same period last year.

A total of 38,165 long tons of natural rubber was consumed in August, compared with 30,019 long tons in July.

Consumption of synthetic rubber, by types (in long tons) in August was: SBR, 79,430, against 64,383 in July; CR, 7,990, against 5,180 in July; IIR, 5,420, against 4,797; NBR, 3,185 against 2,334; stereo and other elastomers, 2,550 against 1,664.

Production of synthetic rubber for August was 114,866 long tons, compared with 111,032 long tons in July. Production (in long tons) by types in August was: SBR, 93,755, against 88,733 in July; CR, 8,282, against 8,267 in July; IIR, 6,312 against 7,763; NBR, 3,172, against 2,887; stereo and other elastomers, 3,345, against 3,382.

Black masterbatch production amounted to 4,782 long tons in August, compared with 2,555 long tons in July; oil black masterbatch production was 23,293 long tons, compared with 20,434 long tons in July, and oil masterbatch was 36,903 long tons, compared with 40,831 long tons in July.

Natural Rubber

The natural rubber market continued its summer slumber during the September 16-October 15 period. Only 2,900 tons of rubber were traded on the New York Commodity Exchange, 2,150 on Rex Contract and 750 on Standard Contract during September. For the September 16-October 15 period, only 2,550 tons were traded, 1,560 on Rex Contract and 990 on Standard Contract.

These transactions compared with 4,530 long tons traded in August and 4,290 in the August 16-September 15 period.

Actually, however, the last few months have seen much less activity than the winter and spring months, and even considerably less than last summer and fall. A total of 10,790 tons was traded last September, for example.

The lack of activity and absence of any real price change have gone together. The price of near rubber on the Rex Contract at the end of the September 16-October 15 period, on October 13, was 29.30¢. At the end of the previous period it was 29.75¢; at the end of July 16-August 15 period, 29.90¢; and at the end of the June 16-July 15 period, 29.30¢. The May 16-June 15 period ended with a 29.75¢ price for near rubber.

The answer is that there haven't been any recent factors to cause any great change in the market. The recent U. S. recession has ended, but improvement in business has not been so marked as to bring expectations of a real boom. The international situation is so confused that it gives no guide either to prospective sellers or buyers. Chances are that prices will continue relatively stable for some months more. A slight drop is possible, but by no means inevitable.

Physical rubber prices were also relatively unchanged. The RSS #1 average for September was 30.21¢, compared with 30.03¢ in August, and the September 16-October 15 average was 29.79¢, compared with 30.36¢ for the August 16-September 15 period.

REX CONTRACT

1961	Sept. 22	Sept. 29	Oct. 6	Oct. 13
Sept.	30.00	....	....	....
Nov.	29.50	29.42	29.50	29.30
1962				
Jan.	29.09	29.00	29.00	28.70

STANDARD CONTRACT

1961	Sept. 22	Sept. 29	Oct. 6	Oct. 13
Nov.	29.30	29.30	29.30	29.10
1962				
Jan.	28.95	28.90	28.80	28.60
Mar.	28.80	28.75	28.70	28.55
May	28.75	28.70	28.50	28.45
July	28.75	28.65	28.40	28.40
Sept.	28.75	28.65	28.35	28.35
Nov.	....	28.65	28.30	28.30

Prices of other representative grades in September were: RSS #3, 29.93¢; #3 Amber Blankets, 28.28¢; and Standard Flat Bark, 22.50¢.

NEW YORK OUTSIDE MARKET

	Sept. 22	Sept. 29	Oct. 6	Oct. 13
RSS #1	30.00	30.00	29.50	29.38
#2	29.85	29.75	29.38	29.25
#3	29.75	29.63	29.25	29.13
Pale Crepe				
#1 Thick	34.50	34.50	34.50	34.38
Thin	33.00	33.00	33.00	32.88
#3 Amber Blankets	28.25	28.25	28.00	27.75
Thin Brown Crepe	28.00	28.00	27.75	27.50
Standard Flat Bark	22.50	22.50	22.00	22.00

Latex

The latex market was quiet during the September 16-October 15 period, and turnover was only moderate. August production and consumption of all latices in the U. S. show a considerable gain over July figures. Production of synthetic latices in August were 10,859 tons, against 7,048 tons in July. Consumption of synthetics was 9,745 tons in August, against 6,850 in July, and natural latex consumption in August reached 3,881 tons, compared to 2,594.

The entire January to August period, however, saw a decrease in consumption of both natural and synthetic latices when compared to consumption during the same period in 1960:

	1961	1960
	Jan./Aug. (Long Tons)	Jan./Aug.
Natural	27,563	33,832
Synthetic	68,654	74,205

U. S. stocks at the end of August stood at 7,294 tons, compared with 8,040 tons on July 31.

(All figures in long tons, dry weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
July	0	3,816	2,594	8,040
August	0	*	3,881	7,294
SBR				
July	5,626	....	5,367	9,248
August	8,911	....	7,420	9,427
Neoprene				
July	1,000	....	641	1,700
August	908	....	990	1,402
Nitrile				
July	782	....	842	2,471
August	1,040	....	1,035	2,339

* Not available yet for period covered.

Dr. Stanley Jankowski, one of Neville's senior chemists, is shown here holding a test chart showing the results of tensile testing three aged rubber samples. The chart is just as it came from the Instron Tester, except that scribe lines have been inked over and labeled for visibility in the picture. They have not been changed. From left to right, samples contained Neville's R-16 Coumarone-Indene Resin, competitive resin A and competitive resin B. Detailed results are shown below.

Competitive tensile test shows Neville Resin superior

Neville's R-16 Coumarone-Indene Resin was matched against two other leading resins in a neutral colored SBR test recipe compounded for comparative analysis. The results were as follows:

	Average Tensile	Aged Average Tensile	% Tensile Retention
Neville's R-16	1830 psi	1400 psi	76.5
Competitor A	1680 psi	1150 psi	68.5
Competitor B	1655 psi	1275 psi	77.2

Beyond superior tensile strength, there are other benefits derived from compounding rubber with R-16 Neville Resin. Elongation, both before and after aging, is exceptional and considerable aid to processing is enjoyed. Better mold flow and easier dispersion of fillers are also realized in using R-16 Neville Resin. Use the coupon to write for further information.

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Reclaimed Rubber

The reclaimed rubber market continued slow for most companies during the September 16-October 15 period. Only one eastern reclaimer reported satisfactory activity and anticipates that business for the second half of 1961 will be 7% higher than it was in the first half. The upward swing anticipated by the other companies did not materialize, however, because of several trends in the automotive industry: the lower level of automobile production, largely a result of the strikes at General Motors and Ford; the greater proportion of two-ply tires for compact cars, which use less rubber than four-ply tires; the switch from rubber mats to carpeting on the floors of automobiles.

United States consumption of reclaimed rubber for August rose to 21,125 long tons from 17,299 long tons in July, according to The Rubber Manufacturers Association, Inc. Production in August was 22,750 long tons, compared to 19,109 in July. Exports were 1,325 long tons, about the same as for July.

Production during the first eight months of this year was only 175,688 long tons, contrasted with 204,928 for the same period last year. Exports for this period rose slightly from 9,820 long tons in 1960 to 10,404 tons this year.

RECLAIMED RUBBER PRICES

Whole tire, first line	$0.115
Third line	.1075
Inner tube, black	.17
Red	.22
Butyl	.16
Light carcass	.22
Mechanical, light-colored, medium gravity	.185
Black, medium gravity	.10

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality workability, and specific gravity, at special prices.

Scrap Rubber

Consumption of scrap rubber for the September 16-October 15 period is running a little higher than during the same period last year. Prices for synthetic butyl tubes, baled and free of valves, are now quoted at 7¢ both at eastern points and in Akron, O., compared to last month's prices of 6.5¢ and 6.75¢, respectively. Other prices remained unchanged.

	Eastern Points	Akron, O.
	Per Net Ton	
Mixed auto tires	$7.00/$11.00	$11.00
S.A.G. truck tires	nom.	nom.
Peeling, No. 1	nom.	nom.
2	nom.	nom.
3	nom.	nom.
	(¢ per Lb.)	
Auto tubes, mixed	6.00	6.00
Black	6.00	6.00
Red	nom.	nom.
Butyl	7.00	7.00

■

Pelletized News

(*Continued from page 104*)

China was interested in buying 90,000 tons of rubber from Indonesia, according to an announcement from Jakarta, Java, in September.

INDUSTRIAL DEVELOPMENT CORP. of South Africa has initiated preliminary discussions on the building and financing of a synthetic rubber plant at Sasolburg. It is unlikely that work will start before February.

The first Czechoslovakian silicone rubber was recently developed at the Research Institute for Macromolecular Chemistry, of Brunn.

THAI TIRE & PRODUCTS CO., LTD., is new joint Thai-American enterprise which will produce daily 600 tires and tubes for trucks, buses, and cars. The company is registered with a capital of $1,000,000 (U. S.) and plans to employ 250 persons.

A combined output of 26,746 tons of rubber for the first half of 1961 was reported by the six largest plantations in South Vietnam. These six planters together account for between 80 and 90% of the total rubber produced in the country. This year's figure is up somewhat from the 25,648 tons reported in the same period of 1960.

IMPERIAL CHEMICAL INDUSTRIES, LTD., London, England, plans erecting a large complex in Rotterdam, Netherlands to produce petrochemicals and allied products.

Ontario Outing

(*Continued from page 90*)

second low gross, Bob Lovett; second low net, Joe Mate; third low gross, Dean Bregman, B. F. Goodrich Canada, Ltd.; third low net, Carl Croakman, Columbian Carbon Canada, Ltd.; low gross, first nine, Dick Knowlton; low gross, second nine, Bill Truax; high score, first hole, Lloyd Lomas, L. V. Lomas Co.

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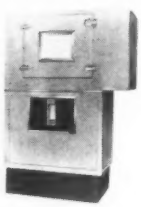

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Silicone Coated Papers Speed Processing of Sticky Products

When processing sticky materials and products, such as raw rubber, candy or resin-bonded laminates, "stickers" can cause lost time and extra cost. They can, but don't . . . if you specify interleaving or process papers with the new Syl-off® silicone stickproof coatings. Syl-off coated papers give quick, easy and complete removal of sticky products, help keep production moving smoothly, hold product waste to a minimum.

AIDS PACKAGING, TOO. Syl-off coated paper and paperboard are now used in packaging a variety of sticky products . . . from asphalt to sweet rolls, from adhesive masses to candied fruits. Standard containers available with Syl-off coated liners or inner surfaces include multiwall bags, fiber drums, unit containers, cores and cartons. Pan liners and wrappers coated with food grade Syl-off may be used in contact with food in compliance with the provisions of the Food Additives Amendment of 1958.

MORE ADVANTAGES. Syl-off coatings have natural nonoily lubricity and water repellency . . . won't migrate, contaminate or transfer . . . won't alter the characteristics of paper stock. Whether you process, ship or receive sticky materials, Syl-off coated papers are worth looking into. For the complete list of Approved Sources, plus a descriptive brochure, write Dow Corning, Dept. 9623. ›

For complete technical information about any silicone product, contact the Dow Corning office nearest you.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

Synthetic Rubbers and Latices*

Monomers

11-80, 100, 200, 112-3 Triols	lb.	$0.225	
11-300	lb.	0.265	
-400	lb.	0.325	
Acrylonitrile	lb.	0.27	
Butadiene	lb.	0.15	
Dow Styrene	lb.	0.12	
H99, N99	lb.	0.205	
RG	lb.	0.17	
Vinyltoluene	lb.	0.17	
Hylene M	lb.	1.25	/ $2.75
M-50	lb.	0.86	/ 2.36
T	lb.	0.85	/ 2.41
TM	lb.	0.70	/ 2.26
-65	lb.	0.75	/ 2.31
Isobutylene	gal.	0.38	
Isoprene	lb.	0.25	
Mondur-C	lb.	1.05	
Multron R-2	lb.	0.54	
P200	lb.	0.23	
Rohm & Haas ethyl acrylate	lb.	0.34	/ 0.36
Glacial methacrylic acid	lb.	0.40	/ 0.425
Methyl acrylate	lb.	0.37	/ 0.39
Methylacrylate	lb.	0.29	/ 0.31

Shortstops

4P Mercaptan	lb.	0.27	/ 0.31
DDM	lb.	0.94	/ 0.975
Mercaptan 174	lb.	0.38	/ 0.50
Sharstop 204	lb.	0.38	/ 0.42
268	lb.	0.52	/ 0.53
Tecquinol	lb.	0.825	/ 0.845
Thiostop K	lb.	0.50	/ 0.53
N	lb.	0.38	/ 0.47
Vulnapol KM	lb.	0.52	/ 0.56
NM	lb.	0.38	/ 0.42
Wingstop B	lb.	0.38	

Acrylic Types

Acrylon BA-15	lb.		1.25[a]
EA-5	lb.		1.00[a]
Hycar 4021	lb.	1.34[e]	/ 1.35[a]
4501	lb.	0.72[e]	/ 0.78[e]

Latex

Hycar 2600 X 30, 2600 X 83, 2600 X 84	lb.	0.48[e]	/ 0.54[e]
2601	lb.	0.50	/ 0.56[e]
2671	lb.	0.46[e]	/ 0.52[e]

Butadiene Types (BR)

Cis-4	lb.	0.30
Diene	lb.	0.30

Cold BR Latex

Pliolite Latex 2104	0.325

Fluorocarbon Types

Fluorel KF-2141	lb.	10.00	/ 10.25
Kel-F Elastomer	lb.	15.00	/ 16.00
5500, 820 (Latex)	lb.	15.00	/ 17.15
"Viton" A, AHV, B	lb.	10.00	/ 10.25

Isobutylene Types (IIR)

Enjay Butyl 035, 065, 150, 215, 217, 218, 325			0.23[a]
165, 268, 365			0.23[a]
Hycar 2202	0.65[e]	/	0.75[e]
Polysar Butyl 100, 200, 300, 301, 400			0.23[d]
402, 450			0.24[d]
600			0.275[d]
Vistanex LM			0.45[a]
MM			0.35[a]

Isoprene Types (IR)

Shell Isoprene Type 300, 305	0.25[a]
307	0.26[a]
500	0.215[a]

Neoprene Types (CR)

Neoprene Type AC, AD, CG	0.55[a]
FB	0.65[a]
GN, GN-A, WB, WX	0.41[a]
GRT, S	0.42[a]
KNR	0.75[a]
W	0.39[a]
WD	0.45
WHV	0.37[a]
W-M1	0.40[a]
WRT	0.45[a]

Latex

Neoprene Latex 571, 842-A	0.37[a]
572	0.39[a]
60, 601-A	0.40[a]
635	0.41[a]
400, 650	0.42[a]
735, 736	0.38[a]
750	0.39[a]
842-A	0.35[a]

Latex

Neoprene Latex 950	$0.47[a]

Nitrile Types (NBR)

Butaprene NF			0.49[b]
NH			0.65[b]
NL			0.50[b]
NXM			0.58[b]
Chemigum, N1NS			0.64[b]
N3NS, N5			0.58[b]
N6, N-6B, N7, N8			0.50[b]
N600			0.50[b]
Hycar 1001, 1041	$0.58[e]	/	0.59[a]
1002, 1042, 1043, 1052, 1053, 1312	0.50[e]	/	0.51[e]
1014	0.60[e]	/	0.61[e]
1072	0.64[e]	/	0.65[e]
1411	0.62[e]	/	0.63[e]
1432, 1441	0.59[e]	/	0.60[e]
Paracril AJ	0.485[e]	/	0.495[e]
B, BJ, BJLT, BLT	0.50[e]	/	0.51[e]
C, CLT	0.58[e]	/	0.59[e]
CV	0.63[e]	/	0.64[e]
D	0.65[e]	/	0.66[e]
OZO	0.45[b]	/	0.46[b]
18-80	0.60[e]	/	0.61[e]
Polysar Krynac 800, 802, 803, 804			0.50[e]
801, 805			0.58[e]

Latex

Butaprene N-300			0.46[b]
N-400, N-401			0.54[b]
Chemigum 235 CHS, 236			0.53[b]
245 B, 245 CHS, 246, 247, 248, 520			0.45[b]
Hycar 1512, 1552, 1562, 1577	0.45[e]	/	0.52[e]
1551, 1561, 1571	0.53[e]	/	0.60[e]
1852	0.46[e]	/	0.52[e]
Nitrex 2612	0.45[a]	/	0.52[a]
2616	0.53[a]	/	0.60[a]
2619	0.52[a]	/	0.59[a]
2620, 2625	0.45[a]	/	0.52[a]
Polysar Latex XPRD-845			0.49[e]
Tylac 640, 650	0.45[e]	/	0.52[e]
750	0.49[e]	/	0.56[e]
850	0.53[e]	/	0.60[e]
1640, 1650	0.54[e]	/	0.61[e]
2430			0.50[e]
2830			0.45[e]

Polyethylene Type

Hypalon 20	lb.		0.47[a]
30	lb.		0.60[a]
40	lb.		0.50[a]

Polysulfide Type

Thiokol LP-2, -3, -12, -31, -32, -33			0.96[a]
-8			1.35[a]
-205			2.50[a]
-370			3.25[a]
Type-A			0.60[a]
FA			0.74[a]
ST			1.25[a]

Latex

Thiokol Latex (dry wt.) Type MX			0.80[a]
WD-2			1.25[a]
-6 (50% solids)			0.80[a]
(75% solids)			1.25[a]

Silicone Types

GE (compounded)	2.17[e]	/	4.83[e]
Gum	3.68[e]	/	4.28[e]
Reinforced			3.06[e]
Silastic (compounded)	2.95[b]	/	3.50[b]
(Partly compounded)	3.15[b]	/	3.60[b]
(Uncompounded)	4.05[b]	/	4.35[b]
LS-53	12.00	/	16.30
Union Carbide (compounds)	2.35[b]	/	3.20[b]
(Gums)	3.85[b]	/	4.25[b]

Styrene Types (SBR)

Hot SBR

Ameripol 1000, 1001, 1006, 1007	0.241[e]	/	0.247[e]
1002	0.2435[e]	/	0.2495[e]
1006 Crumb	0.2475[e]	/	0.2535[e]
1009	0.2475[e]	/	0.2535[e]
Crumb	0.259[e]	/	0.265[e]
1011	0.2475[e]	/	0.2535[e]
1012	0.2425[e]	/	0.2485[e]
Crumb	0.249[e]	/	0.255[e]
1013	0.241[e]	/	0.247[e]
Crumb	0.2615[e]	/	0.2675[e]
ASRC 1004, 1006	0.241[e]	/	0.2475[e]
1009	0.2475[e]	/	0.2535[e]
1018	0.27[e]	/	0.276[e]
1019	0.265[e]	/	0.271[e]
Copo 1006			0.241[e]
FR-S 1000, 1001, 1004, 1006	0.241[e]	/	0.247[e]
1007	0.241[e]	/	0.247[e]
1009	0.2475[e]	/	0.2535[e]
1010	0.26[e]	/	0.266[e]
1012	0.2425[e]	/	0.2485[e]
1013	0.241[e]	/	0.247[e]
Crumb	0.2615[e]	/	0.2675[e]
FR-S 1014	$0.281[e]	/	$0.287[e]
141	0.28[e]	/	0.286[e]
181	0.241[e]	/	0.247[e]
Naugapol 1015	0.35[b]	/	0.355[b]
1016	0.265[b]	/	0.27[b]
1018	0.255[b]	/	0.260[b]
1019, 6003	0.241[b]	/	0.246[b]
1022	0.305[b]	/	0.31[b]
1023	0.33[b]	/	0.335[b]
Philprene 1000, 1006, 6701	0.241[b]	/	0.247[b]
1009	0.2475[b]	/	0.2535[b]
1018	0.27[b]	/	0.276[b]
1019	0.265[b]	/	0.271[b]
Pliotex 1006	0.241[e]	/	0.2447[e]
Polysar S, S-630			0.241[b]
SX-370			0.2475[b]
-371			0.255[b]
S-1000, -1006, -1013			0.23[a]
-1002, -1011			0.2325[a]
-1009			0.24[a]
Synpol 1000, 1001, 1006, 1007, 1013, 1061	0.241[b]	/	0.247[b]
1002	0.2435[b]	/	0.2495[b]
1009	0.2475[b]	/	0.2535
Synpol 1012	0.2425[b]	/	0.2485[b]
8000	0.241[b]	/	0.247[b]
X-274	0.255[e]	/	0.261[e]

Hot SBR Black Masterbatch

Philprene 1100	0.194
1104	0.190[b]
S-1100	0.185[a]

Hot SBR Latex

Copo 2000			0.2775[e]
FR-S 2000, 2001	0.2725[e]	/	0.3425[e]
2002	0.35[e]	/	0.36[e]
2003, 2004	0.305[e]	/	0.36[e]
2006	0.29[e]	/	0.382[e]
Naugatex 2000, 2001	0.275[a]	/	0.355[a]
2002	0.30[a]	/	0.37[a]
2006	0.29[a]	/	0.42[a]
Pliolite Latex 2000			0.275[e]
2001			0.2825[e]
2076			0.295[e]
5300	0.275[e]		
5301	0.305[e]		
Polysar Latex IV			0.2775[e]
S-2000, 2006			0.26[a]
Tylac 405, 430, 450-A			0.275[a]
410			0.29[a]
3040, 3340, 3540			0.32[a]
3410-A			0.275[a]
3500-L			0.295[a]

Cold SBR

Ameripol 1500, 1501, 1502, 4600, 4601	0.241[e]	/	0.247[e]
ASRC 1500, 1502	0.241[e]	/	0.247[e]
1503	0.2652[e]	/	0.2685[e]
3105, 3106	0.241[e]	/	0.247[e]
3110	0.26[e]	/	0.266[e]
C-102			0.23[a]
Baytown 8600			0.241[b]
Copo 1500, 1502, 1507, 1510			0.241[e]
1505-NS			0.251[e]
FR-S 1500, 1502, 146, 179	0.241[e]	/	0.247[e]
127	0.26[e]	/	0.266[e]
Gentro 1500			0.241
Naugapol 1503	0.241[b]	/	0.246[b]
1504	0.35[b]	/	0.355[b]
6100	0.32[b]	/	0.325[b]
Philprene 1500, 1502	0.241[b]	/	0.247[b]
1503	0.2625[b]	/	0.2685[b]
6630	0.251[b]	/	0.257[b]
6631	0.241[b]	/	0.247[b]
Plioflex 1500C, 1502, 1507, 1510	0.241[e]	/	0.247[e]
Polysar Kryflex 200			0.251[b]
202			0.2535[b]
252			0.27[e]
Krylene, NS, 602			0.241[b]
SS-250 (Bale/Flake)			0.2875[e]
S-1500, S-1502			0.23[a]
1509			0.23[a]
Synpol 1500, 1502, 1551, 8103	0.241[b]	/	0.247[b]

Cold SBR Black Masterbatch

Ameripol 1605	0.19[e]	/	0.196[e]
4651	0.177[e]	/	0.183[e]
4659	0.182[e]	/	0.188[e]
4660	0.187[e]	/	0.193[e]
4664	0.1845[e]	/	0.1905[e]
4667	0.208[e]	/	0.214[e]
Baytown 1600, 1601, 1602			0.193[b]
1603A			0.196[e]
1605A			0.190[e]
1606			0.182[b]
1608			0.1845[b]
1609			0.208[b]
8676			0.1876[b]
8679			0.2022[b]
8681			0.1835[b]
B-123			0.182[b]
-134			0.19[e]
Carbomix 1606			0.182[e]
1608			0.1845[e]
1609			0.208[e]
1811			0.1569[e]
CB-102			0.185[a]

[a] Freight extra.
[b] Minimum freight allowed.
[c] Freight prepaid.
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* Prices are per pound carload or tank-car dry weight unless otherwise specified.

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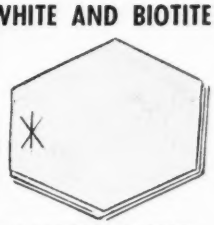

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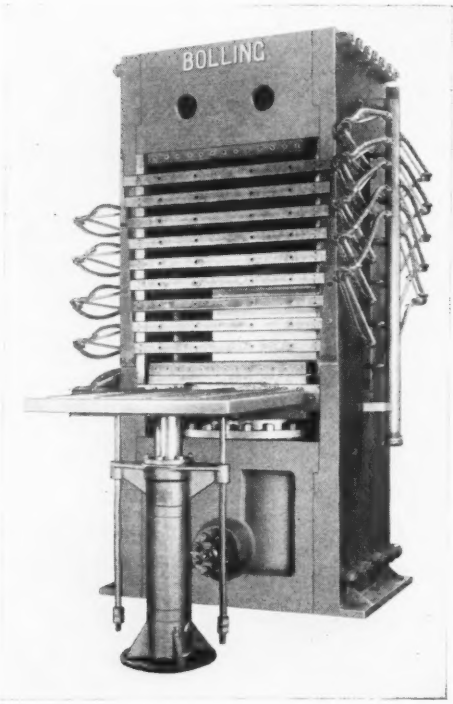

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Gentro-Jet 9152		$0.208
9153		0.182
9154		0.184[c]
Philprene 1601	$0.193[b] /	0.199[b]
1603	0.196[b] /	0.202[b]
1605	0.19[b] /	0.196[b]
1606	0.182[b] /	0.188[b]
1608, 6662	0.1845[b]/	0.1905[b]
1609	0.208[b] /	0.214[b]
6655	0.194[b] /	0.20[b]
S-1600, -1602		0.1825[a]
-1605		0.18[a]
-1606, -1607		0.175[a]
-7652		0.1875[a]
Synpol 8151	0.182[b] /	0.188[b]
8152	0.186[b] /	0.192[b]

Cold SBR Oil Masterbatch

Ameripol 1705	0.2035[c]/	0.2095[c]
1707, 1708	0.191[c] /	0.197[c]
1710, 1712	0.1885[c]/	0.1945[c]
4700	0.175[c] /	0.181[c]
ASCR 1703	0.206[c] /	0.212[c]
1708	0.191[c] /	0.197[c]
1712	0.1885[c]/	0.1945[c]
1713	0.175[c] /	0.181[c]
Baytown 8700		0.1885[b]
Copo 1712		0.1885[c]
1713		0.175[c]
1714		0.1725[c]
1773		0.206[c]
1778		0.191[c]
FR-S 1703	0.206[c] /	0.212[c]
1710	0.1885[c]/	0.1945[c]
1712	0.1885[c]/	0.1945[c]
123	0.196[c] /	0.202[c]
154, 155	0.1885[c]/	0.1945[c]
173	0.206[c] /	0.212[c]
178	0.191[c] /	0.197[c]
Gentro 1712		0.1885
Philprene 1703	0.206[b] /	0.212[b]
1708	0.191[b] /	0.197[b]
1712	0.1885[b]/	0.1945[b]
6700	0.175[b] /	0.181[b]
Plioflex 1703, 1773	0.206[c] /	0.212[c]
1710C, 1712C	0.1885[c]/	0.1945[c]
1713	0.175[c] /	0.181[c]
1714C	0.1725[c]/	0.1785[c]
1773	0.206[c] /	0.212[c]
1778	0.191[c] /	0.197[c]
Polysar Krynol 651, 653, 655		0.1885[b]
652, 654		0.191[b]
S-1703		0.195[a]
-1707		0.18[a]
-1709, -1710, -1712		0.1775[a]
-1778		0.18[a]
Synpol 1703	0.206[b] /	0.212[b]
1707, 1708	0.191[b] /	0.197[b]
1712	0.1885[b]/	0.1945[b]
8200	0.191[b] /	0.197[b]
8201, 8208	0.175[b] /	0.181[b]
8202	0.1725[b]/	0.1785[b]

Cold SBR Oil-Black Masterbatch

Ameripol 1805	0.155[c] /	0.161[c]
1808	0.148[c] /	0.154[c]
1809	0.1545[c]/	0.1605[c]
1810	0.140[c] /	0.146[c]
4756	0.1545[c]/	0.1605[c]
4758	0.145[c] /	0.151[c]
4759	0.1598[c]/	0.1658[c]
4760	0.1576[c]/	0.1636[c]
4761	0.171[c] /	0.177[c]
Baytown 1801		0.176[b]
1803A		0.174[b]
1805A		0.176[b]
1808		0.148[b]
1811		0.1569[b]
1813		0.164[b]
1815		0.1496[b]
1816		0.158[b]
8682		0.189[b]
8775		0.1545[b]
8776		0.1679[b]
8781		0.1665[b]
8782		0.1583[b]
8783		0.1515[b]
8784		0.1598[b]
Carbomix 1809, 1814		0.1545[c]
1813		0.164[c]
1808		0.148[c]
1815		0.1496[c]
1817		0.1715[c]
3761		0.1576[c]
3764		0.1685[c]
Gentro-Jet 9250		0.158
9251		0.164
9252		0.167
9275		0.150
OB-102		0.1825[a]
-104		0.1475[a]
-110		0.141[a]
Philprene 1803	0.174[b] /	0.18[b]
1805	0.155[b] /	0.161[b]
1808	0.148[b] /	0.154[b]
6753	0.1496[b]/	0.1556[b]
6755	0.1715[b]/	0.1775[b]
S-1800		0.1475[a]
-1802		0.141[a]
-1803		0.165[a]
-1806		0.151[a]
-1807		0.154[a]
-1808		0.142[a]

(Continued on page 124)

POLYSAR BUTYL 600

A new high level of unsaturation

In new Polysar* Butyl 600 Polymer Corporation has achieved a much higher level of unsaturation than has been available previously in butyl rubbers.

The increase in cure rate, the higher state of cure and the improvements in heat aging and compression set which Polysar Butyl 600 gives are particularly advantageous in such applications as automotive accessories, machine and motor mounts, dock fenders, bridge bearing pads, rail pads, electrical insulation, high pressure steam hose and conveyor belting.

Write for Technical Report No. 9: 12A to: Marketing Division, Polymer Corporation Limited, Sarnia, Canada.

*Trade Mark Reg'd.

POLYSAR

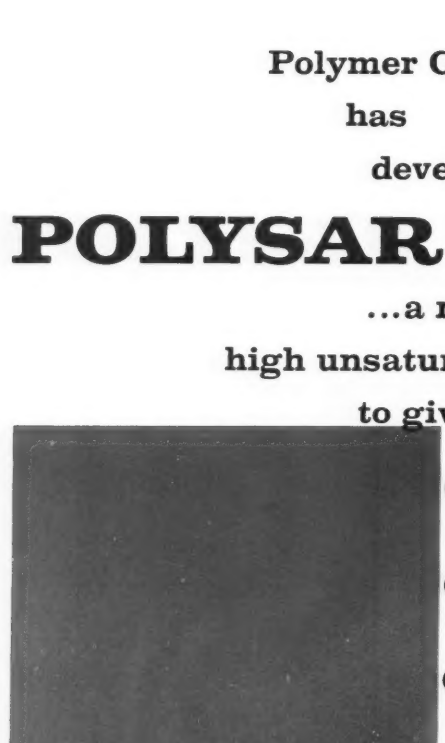
ONE OF THE WORLD'S MAJOR SOURCES OF RUBBER

DISTRIBUTOR: H. MUEHLSTEIN & Co. Inc., 521 FIFTH AVENUE, NEW YORK 17, N.Y., U.S.A.

Polymer Corporation
has
developed

POLYSAR BUTYL 600

...a new
high unsaturation rubber,
to give you



- Faster cure rate
- Lower compression set
- Better low temperature properties
- Improved aging resistance
- Greater resistance to surface tack development in outdoor weathering and in heat-treated tread-type compounds
- Lower heat build-up
- Higher resilience at elevated temperatures

There's a Polysar* rubber for every purpose... General Purpose Rubbers —Butadiene-Styrene Copolymers; Oil Resistant Rubbers—Butadiene-Acrylonitrile Copolymers; Special Purpose Rubbers—Butadiene-Styrene Copolymers; Butyl Rubbers —Isobutylene-Isoprene Copolymers and Latices.

*Trade Mark Reg'd.

POLYSAR

DISTRIBUTORS IN 43 COUNTRIES AROUND THE WORLD

POLYMER CORPORATION LIMITED
SARNIA • CANADA

DISTRIBUTOR: H. MUEHLSTEIN & Co., Inc.
521 Fifth Ave., New York 17, N.Y., U.S.A.

DISTRIBUTORS IN
MEXICO • BRAZIL • ARGENTINA • CHILE

Compounding Ingredients

Accelerators

Accelerator $8	lb.	$1.24 /	$1.25
49	lb.		0.61
552	lb.	2.24 /	2.25
808	lb.	0.65 /	0.68
833	lb.	1.16 /	1.19
Altax	lb.		0.56
Amax	lb.		0.77
#1	lb.		0.73
Amine O	lb.	0.47	
Arazate	lb.		2.25
Beutene	lb.		0.68
Bismate	lb.		3.00
Butazate	lb.		1.04
Butyl Eight	lb.		1.35
Ziram	lb.		1.03
Captax	lb.		0.46
Chemical-Loaded Molecular Sieve CW-1015, CW-1115, CW-3010, CW-3120, CW-3615, CW-9246	lb.		3.00
Conac S	lb.	0.70 /	0.73
C-P-B	lb.		1.95
Cumate	lb.		1.45
Cydac Accelerator, Flaked	lb.		0.73
Cyuram DS & Cyuram DS Pellets	lb.		1.14
MS & Cyuram MS Pellets	lb.		1.14
Delac S	lb.		0.73
DIBS	lb.		0.87
Dipac	lb.		0.85
DOTG	lb.		0.72
DPG	lb.		0.52
Ethazate	lb.		1.04
Ethyl Seleram	lb.		3.00
Thiram	lb.		1.03
Tuex	lb.		1.04
Ziram	lb.		1.03
Ethylac	lb.		0.95
Hepteen Base	lb.		1.85
K-1960 Silicone Cmpd	lb.		5.50
Kure-Blend M.T	lb.	0.70 /	0.70
Ledate	lb.		1.04
MBT	lb.		0.46
MBTS	lb.		0.56
Methazate #100-L & #50-C	lb.		1.04
Methyl Thiram	lb.		1.13
Ziram	lb.		1.03
Mondur TD-80	lb.		0.70
Monex	lb.		1.14
Multrathane M	lb.	1.25	
NA-22	lb.	1.04 /	1.05
NOBS #1	lb.		0.73
Special	lb.		0.77
O-X-A-F	lb.		0.57
Pennzone B	lb.		0.68
E	lb.		0.58
Pentex	lb.		1.24
Flour	lb.		0.30
Permalux	lb.	2.24 /	2.25
Phenex	lb.	0.52 /	0.59
Poly-Dispersion PAD-70	lb.	0.91 /	1.06
PBD-75	lb.	3.18 /	3.33
PCuD-80	lb.	1.77 /	1.92
PDD-70	lb.	2.65 /	2.80
PDOTGD-65	lb.	1.07 /	1.22
P(DPG)D-65	lb.	0.87 /	1.02
PDSD-715	lb.	2.52 /	2.67
PeTD-70	lb.	1.41 /	1.56
PGAD-72	lb.	1.56 /	1.71
PMD-75	lb.	0.79 /	0.94
PmTD-70	lb.	1.46 /	1.61
P(Mx)D-80	lb.	1.51 /	1.66
PMxSD-80	lb.	0.75 /	0.90
PMzD-75	lb.	1.34 /	1.49
PND-70	lb.	1.30 /	1.45
PNPD-72	lb.	1.75 /	1.90
PRGAD-78	lb.	1.02 /	1.17
PTD-75	lb.	1.86 /	2.01
PTetD-70	lb.	2.22 /	2.37
PXD-70	lb.	0.99 /	1.14
P(Za)D-75	lb.	1.04 /	1.19
PZEND-75	lb.	0.84 /	0.99
RIA 66	lb.		0.52
Selenac, Ethyl	lb.		3.00
Methyl	lb.		3.00
SPDX-GH	lb.	0.69 /	0.74
Sulfads	lb.		1.98
Tellurac: Ethyl	lb.		1.75
Rodform	lb.		1.40
Tetrone A	lb.	1.97 /	1.98
Thiate A	lb.		0.88
B	lb.		1.25
Thionex	lb.	1.13 /	1.14
Thiuram E	lb.	1.03 /	1.04
M	lb.	1.13 /	1.14
Trimene	lb.		0.58
Base	lb.		1.06
Triphenylguanidine	lb.	0.90	
Tuads, Ethyl	lb.		1.04
Methyl	lb.		1.14
Tuex—for Naugets & Flour	lb.		1.14
Ultex	lb.	1.00 /	1.10
Unads	lb.		1.14
Vulcacure TMD	lb.		1.14*
ZT	lb.		0.55*
Z-B-X	lb.		2.45
Zenite	lb.	0.53 /	0.56
A	lb.	0.68 /	0.71
AM	lb.	0.75 /	0.78
Zetax	lb.		0.57

These prices, in general, are f.o.b. works. Where prices are specifically designated as delivered prices by the supplier, they are marked by an asterisk. **The first price column** indicates the carload or tank-car figure. This may also be the truck-load, tank-wagon, or mixed load price. **The second price column** gives a less-than-truck-load figure, based upon a convenient shipping weight of the material in the supplier's normal package. There may be other price breaks for larger quantities such as multi-ton or multi-drum lots. There will also normally be a price increase for special packaging or small quantities. Where the supplier indicates a "standard package" in the listed prices, this price is the one given in the second column. While no prices are included which have not been confirmed by the supplier within the past year, no guarantee is made of these prices. Spot prices should be obtained from individual suppliers.

Zimate, Butyl	lb.		$1.04
Ethyl	lb.		1.04
Methyl	lb.		1.04
ZMBT	lb.		0.57

Accelerators, Latex

Butazate 50-D	lb.		1.04
Butyl Namate	lb.		0.50
Cyzate B	lb.		0.89
E	lb.		0.89
Ethazate 50-D	lb.		0.89
J-172 Accelerator Dispersion	lb.		0.75
209 Accelerator Dispersion	lb.		1.60
309 Dispersion	lb.		0.85
316 Dispersion	lb.		1.00
754 Dispersion	lb.		0.50
Merac	lb.		1.03
Methyl Ziram	lb.		1.05
Pennac SDB	lb.		0.48
Setsit 5	lb.		1.05
9	lb.		1.15
Tepidone	lb.		0.45
Thiate B	lb.		1.25
Trimene	lb.		0.58
Vulcacure NB	lb.	$0.45* /	0.48*
NS	lb.		0.75*
ZB	lb.	0.85*	
ZE	lb.	0.85*	
ZM	lb.	0.85*	
Vult-Accel B	lb.	0.85	
E	lb.	0.85	
Zenite Special	lb.		0.57
Zimate, Butyl	lb.		1.04

Activators

Aktone	lb.	0.2125/	0.2325
Alamine 7	lb.	0.42	
46	lb.	0.22	
H26	lb.	0.37	
AZO ZZZ	lb.	0.125 /	0.135
Barak	lb.		0.65
Catalin Resin 9481	lb.	0.365	
Coconut Fatty Acid	lb.	0.215	
Cottonseed Oil Fatty Acid	lb.	0.1475	
D-B-A	lb.		0.195
Diethylene Glycol	lb.	0.1775	
Elastomag #20, #100, #170	lb.	0.235 /	0.28
Emersol 220 White Oleic Acid	lb.	0.1575/	0.2075
221 Low Titer White Oleic Acid	lb.	0.1575/	0.2075
Hyfac 400 Hydrogenated Fatty Acid	lb.	0.10125/	0.1325
430 Hydrogenated Fish Fatty Acid	lb.	0.16375/	0.195
Kadox-15	lb.	0.13	
-25	lb.	0.135	
-72	lb.	0.13	
Laurex	lb.		0.39
Lauric Acid	lb.	0.45	
Lime, Hydrated	ton	25.85*	
Litharge	lb.	0.1325	
MODX	lb.	0.295 /	0.345
Oleic Acid	lb.	0.14 /	0.1975
Pasco Lead-Free Zinc Oxide	lb.	0.125	
Plymouth Zinc Stearate	lb.	$0.41	
Poly-Dispersion PGD-70	lb.	2.80 /	$2.95
PHZD-70	lb.	0.62 /	0.77
PLD-90	lb.	0.38 /	0.45
P(MgO) D-65	lb.	0.74 /	0.89
PRD-90	lb.	0.38 /	0.45
PZD-85	lb.	0.42 /	0.57
PZND-78	lb.	0.61 /	0.76
-84	lb.	0.54 /	0.69
-825	lb.	0.50 /	0.65
PZNPD-80	lb.	0.97 /	1.12
Polymel Actisil Resin	lb.		0.27
Sublac PX-5	lb.	0.115	
Protox-166	lb.	0.125	
-167	lb.	0.125	
-168	lb.	0.13	
-169	lb.	0.13	
-267	lb.	0.1275	
-268	lb.	0.1325	
Ridacto	lb.		0.26
St. Joe Black Label #20	lb.	0.125	
#20-21	lb.	0.125	
Green Label #12	lb.	0.125	
#42	lb.	0.125	
#42-21	lb.	0.125	
#42A-3	lb.	0.125	
#43	lb.	0.125	
Red Label #30	lb.	0.125	
#31	lb.	0.125	
Schenectady SP-1045 Resin	lb.	0.3825	
Seedine	lb.	0.1075	
Special-3	lb.	0.125	
Stearic Acid	lb.	0.10 /	0.125
Dar-Chem 10	lb.	0.1325/	0.1575
Triethanolamine	lb.	0.245	
Wecoline 00	lb.	0.165 /	0.20
AAB	lb.	0.2625/	0.3275
V RO (Vegetable Red Oil)	lb.	0.135 /	0.16
XX-4	lb.	0.125	
-78	lb.	0.13	
-178	lb.	0.125	
-203	lb.	0.125	
Zinc Carbonate	lb.	0.13	
Oxide	lb.	0.115 /	0.145
Stearate	lb.	0.41 /	0.46

Activators, Latex

Kadox-215	lb.	0.135	
Zinc Oxide, Dispersed	lb.		0.21
Dispersion #2	lb.	0.141	

Adhesives and Bonding Agents

Bakelite CLS-3112	lb.	0.205	
Braze	gal.		9.00
Cover Cement	gal.		4.00
Chemlok 201, 203	gal.		6.50
220	gal.		10.65
607	gal.		18.00
EX-B150-1	gal.		9.85
B501-4	gal.		7.80
B579-1	gal.		20.40
Durez 12987	lb.	0.49	
Eastman 910 Adhesive	lb.		75.00
Loxite	gal.		6.20
Thixon B-Series Cements	gal.		6.00
M-Series Cements	gal.		10.00
P-Series Cements	gal.		10.00
X-Series Cements	gal.		20.00
Ty-Ply 3640	gal.		8.00
BC	gal.		6.00
BN	gal.		8.00
Q	gal.		8.00
RC	gal.		5.00
S	gal.		8.00
UP	gal.		8.00

Anti-Blocking Agents, Latex

Dispersion 33	lb.		0.25

Antifoam Agents, Latex

Antifoam P-C	lb.		0.65
Antimussol WL	lb.		1.95
Capryl Alcohol	lb.	0.195 /	0.24
Dow Corning Antifoam A	lb.		4.38
C	lb.		1.67
Foamnix	lb.		0.012
Hallco 365	lb.		0.70
C-451	lb.	0.30 /	0.40
Hodag Antifoam FD-82	lb.	1.63 /	1.73
PV-45B	lb.	0.285 /	0.295
-48	lb.	2.23 /	0.24
TBX	lb.	0.34 /	0.35
J-114 Emulsion	lb.		3.25
SAG 47 Silicone Antifoam Fluid	lb.	4.38	
470 Silicone Antifoam Emulsion	lb.	0.55	
471 Silicone Antifoam Fluid	lb.	2.00	

Antioxidants, Antiozonants, and Inhibitors

AgeRite Alba	lb.		2.50
DPPD	lb.		1.14
Gel	lb.		0.72
Hipar	lb.		1.07
HP	lb.		0.81
ISO	lb.		1.84
Powder	lb.		0.59
Resin	lb.		0.90
D	lb.		0.59
Spar	lb.		0.59

AgeRite Stalite	lb.		$0.59
S	lb.		0.59
Superflex	lb.		0.59
Superlite	lb.		0.59
White	lb.		1.60
Arkoflex C Pellets	lb.		0.87
CD Pellets	lb.		0.81
Aminox	lb.		0.59
Amoco 533 Antioxidants	lb.		0.57*
Antioxidant 425	lb.		2.50
2246	lb.		1.53
Antistatic Agent GM	lb.		0.50
Antisun (Slabbed)	lb.		0.165
Antox	lb.		0.61
Aranox	lb.		3.25
Betanox Special	lb.		0.99
B-L-E & B-L-E-25	lb.		0.59
Catalin Antioxidant CAO-1	lb.	$0.57	
-3	lb.	0.65	
-5	lb.	1.49	
Copper Inhibitor 50	lb.		1.20
Eastzone #30, #31	lb.	0.94 /	0.97
#32	lb.	1.15 /	1.18
Ethyl Antioxidant 702	lb.	0.84*	
703	lb.	1.21*	
Flexamine G	lb.		0.81
Flexzone 3-C	lb.		1.42
6-H	lb.		1.37
Fura-Tone NC-1012	lb.	0.65	
Heliozone	lb.		0.32
NBC	lb.		1.67
Naugawhite	lb.		0.59
Neozone A Pellets	lb.		0.66
C Pellets	lb.		0.88
D	lb.		0.59
Nevastain A	lb.	0.51 /	0.53
B	lb.	0.51 /	0.61
Nonox CI	lb.		1.55
WSL	lb.		1.47
WSP	lb.		1.50
ZA	lb.		1.99
Octamine	lb.		0.59
Ozono	lb.		0.80
PDA-10	lb.		0.50
Pennox A	lb.		0.59
B	lb.		0.69
C	lb.		0.59
D	lb.		0.59
Pennzone B	lb.		0.68
E	lb.		0.58
Polygard	lb.		0.59
Rio Resin	lb.		0.72
Ross Sunproofing Wax #1343	lb.		0.15
Stabilite	lb.	0.55 /	0.59
Alba	lb.	0.72 /	0.79
White	lb.	0.52 /	0.60
STD	lb.		0.82
-X	lb.		0.52
Suconox-12	lb.		2.50
Sunproof 713	lb.		0.27
Improved	lb.		0.26
Jr.	lb.		0.23
Regular	lb.		0.33
Super	lb.		0.42
Tenamene 3	lb.	0.57 /	0.60
Tenox BHA	lb.		4.75
BHT	lb.		0.68
PG	lb.		4.40
Thermoflex A Pellets	lb.		1.07
Tinuvin P	lb.	6.65	
Tonox	lb.		0.56
UOP 88	lb.	0.94*	
288	lb.	0.94*	
Zalba	lb.		1.10
Special	lb.		0.85

Antioxidants, Antiozonants & Inhibitors, Latex

2,5-Di-tert-butylhydroquinone	lb.		1.17
J-138 Dispersion	lb.		1.30
-139 Dispersion	lb.		1.45
-248 Dispersion	lb.		1.10
-293 Dispersion	lb.		1.33
-413 Dispersion	lb.		0.59
-442 Dispersion	lb.		1.70
-530 Dispersion	lb.		0.65
-588 Dispersion	lb.		0.45
-851 Wax Emulsion	lb.		0.22
Stabilite L	lb.	0.60 /	0.64
Wax Emulsion #5	lb.		0.195

Blowing Agents and Blowing Promoters

B-I-K	lb.		0.22
Celogen	lb.		1.95
AZ	lb.		1.94
Diazoaminobenzene	lb.		0.73
Dow Corning 199	lb.		2.44
EF-4527 Emulsion	lb.		1.59
200 Fluid	lb.		2.47
Magcarb W	lb.	0.195 /	0.235
Nitrosan	lb.		2.25
Poly-Dispersion PC(AZ)D-75	lb.	2.18 /	2.33
PCD-75	lb.	2.12 /	2.27
Sodium Bicarbonate	lb.	0.0255	
Unicel ND	lb.		0.74
NDX	lb.		1.44
S	lb.		0.20
Vulcacel B 40	lb.		1.36
BN	lb.		0.68

‡ At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

Carbon Blacks‡

CHANNEL BLACKS

Conductive Channel Blacks—CC

Continental R 40	lb.	$0.26 /	$0.35
Dixie 5 Dustless	lb.	0.14 /	0.225
Kosmos/Dixie BB	lb.	0.26 /	0.35
Voltex	lb.	0.26 /	0.35

Easy Processing Channel Blacks—EPC

Continental AA	lb.	0.085 /	0.1625
EPC (Easy Processing Channel)	lb.	0.085 /	0.1625
Kosmobile 77	lb.	0.085 /	0.1625
Micronex W-6	lb.	0.085 /	0.1625
Spheron 9	lb.	0.085 /	0.1625
Witco #12	lb.	0.085 /	0.1625
Wyex EPC	lb.	0.085 /	0.1625

Medium Processing Channel Blacks (MPC)

Arrow MPC	lb.	0.085 /	0.1625
Continental A	lb.	0.085 /	0.1625
Kosmobile S-66	lb.	0.085 /	0.1625
MPC (Medium Processing Channel)	lb.	0.085 /	0.1625
Spheron 6	lb.	0.085 /	0.1625
Standard Micronex	lb.	0.085 /	0.1625
Witco #1	lb.	0.085 /	0.1625

FURNACE BLACKS

Conductive Furnace Blacks—CF

Aromex CF	lb.	0.0875/	0.155
Conductex SC	lb.	0.13 /	0.215
Beads	lb.	0.115 /	0.19
Continental CF	lb.	0.11 /	0.17
Shawinigan Black	lb.	0.20 /	0.31
Vulcan C	lb.	0.11 /	0.185
SC	lb.	0.18 /	0.255
XC-72	lb.	0.25 /	0.34

Fast Extruding Furnace Blacks—FEF

Arovel FEF	lb.	0.0675/	0.135
Continex FEF	lb.	0.0675/	0.135
Kosmos 50	lb.	0.0675/	0.135
Philblack A	lb.	0.0675/	0.135
Statex M	lb.	0.0675/	0.135
Sterling SO	lb.	0.0675/	0.135

Fine Furnace Blacks—FF

Statex B	lb.	0.0725/	0.14
Sterling 99	lb.	0.0725/	0.14

General Purpose Furnace Blacks—GPF

Arogen GPF	lb.	0.06 /	0.1275
Continex GPF	lb.	0.06 /	0.1275
Kosmos 35	lb.	0.06 /	0.1275
Statex G	lb.	0.06 /	0.1275
Sterling V	lb.	0.06 /	0.1275

High Abrasion Furnace Blacks—HAF

Aromex HAF	lb.	0.0775/	0.145
Continex HAF	lb.	0.0775/	0.145
Kosmos 60	lb.	0.0775/	0.145
Philblack 0	lb.	0.0775/	0.145
Statex R	lb.	0.0775/	0.145
Vulcan 3	lb.	0.0775/	0.145

High Modulus Furnace Blacks—HMF

Continex HMF	lb.	0.0625/	0.13
Kosmos 40	lb.	0.0625/	0.13
Modulex HMF	lb.	0.0625/	0.13
Statex 93	lb.	0.0625/	0.13
Sterling L	lb.	0.0625/	0.13

Intermediate Super Abrasion Furnace Blacks—ISAF

Aromex ISAF	lb.	0.0925/	0.16
Continex ISAF-HM	lb.	0.0925/	0.16
Kosmos 70	lb.	0.0925/	0.16
Philblack I	lb.	0.0925/	0.16
Statex 125	lb.	0.0925/	0.16
Vulcan 6	lb.	0.0925/	0.16

Low Structure Furnace Blacks

Neotex 100	lb.	0.0775/	0.145
130	lb.	0.0925/	0.16
150	lb.	0.115 /	0.19
Regal 300	lb.	0.0775/	0.145
600	lb.	0.0925/	0.16

Semi-Reinforcing Furnace Blacks—SRF

Continex SRF	lb.	0.0575/	0.125
Essex SRF	lb.	0.0575/	0.125
Furnex	lb.	0.0575/	0.125
Kosmos 20	lb.	0.0575/	0.125
Pelletex	lb.	0.0575/	0.125
NS	lb.	0.0575/	0.125
Regal SRF	lb.	$0.0575/	$0.125
Sterling NS	lb.	0.0575/	0.125
S	lb.	0.0575/	0.125

Super Abrasion Furnace Blacks—SAF

Aromex SAF	lb.	0.115 /	0.1825
Kosmos 85	lb.	0.115 /	0.19
Philblack E	lb.	0.115 /	0.19
Statex 160	lb.	0.115 /	0.19
Vulcan 9	lb.	0.115 /	0.19

THERMAL FURNACE BLACKS

Fine Thermal Blacks—FT

P-33	lb.	0.0625/	0.10
Sterling FT	lb.	0.0625	
-FF	lb.	0.0625	

Medium Thermal Furnace Blacks—MT

Sterling MT	lb.	0.045	
-FF	lb.	0.045	
-NS	lb.	0.055	
-FF	lb.	0.055	
Thermax	lb.	0.045 /	0.0825
Stainless	lb.	0.05 /	0.0925

Carbon Blacks, Latex

Black Shield 4	lb.	0.10 /	0.105
6	lb.	0.11 /	0.115
17	lb.	0.125 /	0.13
19	lb.	0.12 /	0.125
Dispersed Black #25	lb.		0.18

Chemical Stabilizers

Litharge	lb.	0.1325	

Coagulants, Latex

Acetic Acid	lb.	0.10	
Calcium Chloride	lb.		0.32
Coagulant #7	gal.	2.00	
Formic Acid	lb.	0.1525	
Glycolic Acid	lb.	0.073	
Hydrochloric Acid	ton	30.00	
Zinc Nitrate	lb.	0.14 /	0.145

Creaming Agents, Latex

Protamon S	lb.	1.10	
Protatek A 155	lb.	0.754	
Superloid	lb.		1.10

Dispersing Agents, Latex

Aerosol OT	lb.		0.75
Alrosol	lb.	0.45	
Casein BI	lb.		0.32
Darvan #1	lb.		0.2825
#2	lb.		0.2675
#3	lb.		0.2675
Naccotan A	lb.	0.1725	
Protovac PK-9	lb.		0.46
PV-8397	lb.		0.58
-8979	lb.		0.45
Sodium Laurate	lb.		0.64
Stearate	lb.		0.47
Webnix	lb.		1.50

Dusting Agents and Dipping Agents

AMC Mica	ton		71.00
Aquazinc	lb.		0.30
Concord Mica	lb.	0.075 /	0.09
Extrud-O-Lube	gal.		1.54
Fibrene C-400	ton		34.00
Glycerized Liquid Lubricant (Conc.)	lb.		1.48
Glyso-Lube Compounds	lb.		0.14
Hydro-Zinc	lb.		0.20
Lubrex	lb.		0.27
160 Mesh Water Ground Biotite Mica	lb.	0.065 /	0.0725
White Water Ground Mica	lb.	0.08 /	0.0875
Mica	lb.		0.0925
C-1000	lb.	0.08 /	0.0875
-3000	lb.	0.0825/	0.09
Micalith-G	lb.	0.0225/	0.0275
Micro-Mica	lb.	0.0825/	0.09
Pigmented Separex	lb.		0.105
#20	lb.		0.115
"LG"	lb.		0.105
"R"	lb.		0.10
Rexanol	lb.		0.13
Sierra White Talc	ton		21.75
Silversheen Mica	lb.		0.075
Talc	ton		9.75
EMTal 42-R	ton	15.70 /	39.00
500	ton	34.00 /	68.90
549	ton	67.00 /	120.00
Triple A Mica	ton	40.00	
Union Carbide LE-420 Silicone Oil Emulsion	lb.	1.18	
Versa-Lube	lb.		0.18
"B"	lb.		0.17

CLASSIFIED ADVERTISEMENTS

All Classified Advertising Must Be Paid in Advance
(No agency commission allowed except on display units)

GENERAL RATES	Light face type 20 cents per word. Bold face type 25 cents per word. Minimum $9.00.
SITUATIONS WANTED RATES	20 words or less $1.00. Extra words 10 cents each.
CONSULTANTS DIRECTORY	4 lines $10.00 per insertion.

Allow eight words for keyed address.

Letter replies forwarded without charge, but no packages or samples
ADDRESS ALL REPLIES TO NEW YORK OFFICE AT 630 THIRD AVENUE, NEW YORK 17, N. Y.

SITUATIONS OPEN

SENIOR RESEARCH CHEMISTS

Challenging openings on San Francisco peninsula.
Degree in Chemistry or Chemical Engineering.
Ten years experience in rubber compounding and production.
Record of development in precision molded rubber products.
Salary open-Liberal benefits.
Advantages of small division with security and financial stability of large corporation.
Replies confidential.

Send resume to
Box #2632, RUBBER WORLD

EXECUTIVE TECHNICAL SALES

Nelson EMPLOYMENT SERVICE

SEND CONFIDENTIAL RESUME TO

specialist for the "Rubber Industry"

HAROLD NELSON MGR. **600 First National Tower**
Phone: FRanklin 6-6861 **Akron 8, Ohio**

COMPOUNDER

5 years' experience in small/medium sized mechanical rubber goods plant. Experience in factory service and trouble shooting. Working acquaintance with all conventional elastomers. Thoroughly versed in ASTM and general laboratory procedures. Capable of independent action, desire for position and responsibility. Degree in chemistry desirable. Old established Midwest molded goods manufacturer. Salary open. Address Box No. 2655, care of RUBBER WORLD.

WANTED—COST ESTIMATOR FOR MEDIUM-SIZE AAA1 molded and extruded rubber goods manufacturer located in small Michigan community. Write in confidence to Box No. 2658 care of RUBBER WORLD. All inquiries will be answered.

SITUATIONS WANTED

RUBBER CHEMIST WITH LONG DEVELOPMENT AND PRODUCtion background. Soling of any hardness, floating type and microcellular. Washerless heels. Press vulcanized shoes. Open for steady assignment or consulting. Address Box No. 2657, care of RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE
NASH HYTOR COMPRESSORS

4—Size #2, 860 RPM, 10# pressure 240 C.F.M. 180 C.F.M. when used as Vacuum Pumps.

SEYBOLD PRECISION TRIMMER

1—64", Serial #6959, complete w/power driven back gauge and 7½ HP belt driven motor, 3 ph. 60 cy. 440 v.
Also, a large quantity New S.S. Valves, all sizes, 60% off List Price.
DALTON SUPPLY CO., 2181 E. Huntingdon St., Philadelphia 25, Pa.

ANNOUNCING
INDUSTRIAL LIQUIDATION DIVISION
that's the name of this new division of our
86-YEAR-OLD COMPANY

The Joseph Rosenthal's Sons, Inc., of 1841 North Second Street, Philadelphia 22, Penna., have over the past several years been actively engaged in plant dismantling and demolition work. We have safely and satisfactorily completed many contracts for some of the leading firms in the country. We have acquired through our plant dismantlement work and also by outright purchase —hundreds of pieces of good used equipment that we have sold to the Rubber, Chemical, Paint, Plastics, etc. Companies. We say—"Business is good and will get better"—therefore, in order to better serve our growing clientele we have formed our INDUSTRIAL LIQUIDATION DIVISION. If you have idle equipment that you wish to dispose of—drop us a note with full description and we will quote you fair prices. We own and operate heavy equipment such as cranes, dozers, trucks, loaders, etc., and your invitation to us to dismantle, demolish, move your equipment to other locations, or scrap out entire plant or any part thereof, will have the prompt attention of our qualified personnel, who will inspect and submit the best proposal to save you dollars. Snip out our announcement—NOW—add our name to your list of suppliers. We can be of reliable service to you and await your reply.

MIXERS/SHREDDERS

Baker Perkins—5 UNITS available. Size VL/BB—Jacketed—320-Gal. total Capacity—200-Gal. working Capacity. Double Sigma-Type Blades with removable serrated shoes. Double Screw Tilt with motor drive. NOTE:—We believe these "screw tilt type mixers"—to be the best on the market. Cost you more than 'counter weight type'—but believe well worth it. Only five (5) units left from original and identical fourteen (14) purchased. ACT FAST—CALL NOW—REgent 9-2816—ROSENTHAL, 1841 North Second Street, Philadelphia 22, Pa.

DISINTEGRATORS

9 UNITS Available—RIETZ Model RDH-18 with 50-HP. Motors and Controls. Also 9 Viking Pumps, Model DQ with 7½ HP.—155 RPM Gearhead Motors. NOTE: We purchased this equipment from our customer at Clinton, Iowa. Then—they called us to ask our permission to delay delivery for about 90 days.—"O.K. we said"—To you we say,—"We will accept your orders now for delayed delivery at a much lower price than we would have to charge after removal and placing in storage." We sold every previous Disintegrator we had in stock—so to our former disappointed customers and new ones too, we further say—DON'T DELAY—CALL ROSENTHAL NOW —REgent 9-2816—or mail your order (subject to prior sale of course) to 1841 North Second Street, Phila. 22, Penna.

FILTER PRESSES:

The well-known SHRIVER make, all in excellent condition and only 38 Units left.—28-30" size—2-24"—and 8-12"—all with desired amount of plates plates and frames.
Closed Delivery—Single feed and discharge. Pyramid design plates: Call or write your reliable source of supply—ROSENTHAL, 1841 North Second Street, Philadelphia 22, Pa. REgent 9-2816.

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS

UNITED

HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST. **CABLE "URME"** **NEWARK 4, N. J.**

Waterground Mica	ton	$0.075 / $0.085
Western #325 Mica	lb.	0.0725
Wet-Zinc #40	lb.	0.245
"A"	lb.	0.2225
"CW," "P"	lb.	0.20
Zinc Stearate	lb.	0.41* / 0.46*

Finishes

"B" Wax White	lb.	0.39
Yellow	lb.	0.36
Black-Out	gal.	8.00
Chlorine	lb.	0.0325
#12 Micro Wax	lb.	0.21
15 Micro Wax	lb.	0.24
Pumice	lb.	0.045
Shellac	lb.	0.35
Snow-White Ozokerite #4	lb.	0.43
#160	lb.	0.305
#180	lb.	0.435
3 Star Natural-Yellow Ozokerite	lb.	0.34
Snow White Ozokerite	lb.	0.47
VanWax	gal.	2.05
Wax, Montan, Synthetic	lb.	0.50
White Ozokerite #145	lb.	0.28
#177	lb.	0.39

Gelling Agents, Latex

DOTG	lb.	0.72
DPG	lb.	0.52
Potassium Silicofluoride	lb.	0.095
Sodium Silicofluoride	lb.	0.065 / 0.0725
Stay B N2	lb.	0.30
Trimene Base	lb.	1.06

Miscellaneous Materials, Latex

Aliquat 4	lb.	0.58
Anti-Webbing Agent J-524	lb.	0.39
Aquarex SMO	lb.	0.50
Degell	lb.	0.70
Latex Perfumes 5	lb.	3.25

Non-Black Materials

AA White Factice	lb.	0.2575
Afton Clay	ton	14.50
Aiken EW	ton	14.50
Albacar 5950, 5960, 5970	ton	55.00 / 60.00
Allied K-1	lb.	0.07
Whiting	ton	11.50
Alsite Clay	ton	36.00
Amberex Type B Factice	lb.	0.355
B-R Factice	lb.	0.36
D Factice	lb.	0.435
S Factice	lb.	0.325
S-R Factice	lb.	0.33
Ammonium Sulfate	ton	56.00
Asbestol Regular	ton	28.00
Superfine	ton	33.00
ASP 106	ton	57.00
Atomite	ton	35.00
Barber Gilsonite	ton	47.00
Barden R. Clay	ton	12.00
Barytes 95 White	ton	35.00
Barytes, #1	ton	60.00 / 60.00
#22	ton	30.00
Foam A Brand	ton	60.00
Primex Brand	ton	66.00
X10R Brand	ton	95.00
B. I. White #1	ton	10.00
Blanc Fixe	ton	160.00
Brown Factice, #173	lb.	0.158
-C	lb.	0.145
174	lb.	0.1875
Brown Vulcanized Vegetable Oils	lb.	0.2395
Buca Clay	ton	45.00
Cab-O-Sil	lb.	1.45
Calcene CO	ton	115.00
NC	ton	100.00
TM	ton	102.50
Calcium Carbonate (Whiting)	ton	22.00
C-C-O White Brand	ton	28.00
Sulfate	ton	60.00 / 65.00
Calwhite	ton	22.00
Camel-Carb	ton	14.00
-Tex	ton	22.00
-Wite	ton	35.00
Car-Bel-Lite	lb.	0.36
Car-Bel-Rez C	lb.	0.126
Catalpo Clay	ton	30.00
CCC-#1	ton	10.50 / 12.50
-"G"	ton	15.00 / 17.00
Celite #270	ton	55.00 / 121.00
#292	ton	36.00 / 95.00
#315	ton	137.00 / 255.00
Champion Hard Clay	ton	10.00
Citrus Seed Meal	ton	65.00
Clay, #20	ton	30.00
30	ton	40.00
100	ton	65.00
4200	ton	13.00 / 36.00
Iceberg	ton	53.00
Icecap K	ton	65.00
Crown Clay	ton	14.50
Darex 430	lb.	0.36
Davenite	lb.	0.075
DCI Light Magnesium Carbonate	lb.	0.11
Dixie Clay	ton	14.50
Duramite	ton	22.00
Durez 5117	lb.	0.94
Durez 11078	lb.	$0.355
E Special White Factice	lb.	0.21
Earth, Diatomaceous	lb.	$0.02
Fabrifil	lb.	0.35
Filfloc	lb.	0.16
Gamaco	ton	35.00
-T	ton	40.00
Gamakal	ton	40.00
Gilsonite	ton	98.50
GK Soft Clay	ton	11.50
Glomax HE	ton	65.00
LL	ton	53.00
PVR	ton	40.00
Hakuenka CC	lb.	0.061
Harwick Clay #1	ton	30.00
-P	ton	30.00
2	ton	29.00
12	ton	45.00
15	ton	21.50
42	ton	25.00
50-R	ton	50.00
-ST	ton	47.00
HC-75 Clay	ton	12.00
-100	ton	14.50
Hi-Sil 233	lb.	0.095
Hi-White R Clay	ton	14.50
Hydrite	ton	50.00
Flat D	ton	25.00
PXS	ton	45.00
RS	ton	30.00
Hydroquinone Di-(β-hydroxyethyl) Ether	lb.	1.35
Industrial Filler #100	ton	9.05
Kalkarb	ton	11.50
Kalmac	ton	25.00
Kaolloid Clay	ton	11.00
Keystone White	ton	22.00
LAC Special White Factice	lb.	0.23
LGB Clay	ton	17.50
LGP Clay	ton	20.00
Lithopone	lb.	0.14
Magcarb L	lb.	0.11 / 0.13
Magnesia, Calcined	lb.	0.23
Heavy	ton	120.00
Magnesium Carbonate	lb.	0.11 / 0.14
Marbon QBX-1	lb.	0.30*
-1E	lb.	0.30*
Marter-White RG	ton	20.00
Special X	ton	21.50
XX	ton	24.50
McNamee Clay	ton	14.50
Michigan Basic Magnesium Carbonate	lb.	0.11
Micro Velva A	ton	61.00
B	ton	53.00
Micromya	ton	35.00
Mistron Vapor	lb.	0.035
Modified Brown Vulcanized Vegetable Oils	lb.	0.1870
Natka 1200 Hard Clay	ton	12.00 / 40.00
Neophax A Factice	lb.	0.1885
D Factice	lb.	0.36
K Factice	lb.	0.1725
Nylon N-16	lb.	0.55
OMYA BLR 3	ton	60.00
BSH	ton	46.50
Par Clay	ton	12.00
Paragon Clay	ton	14.50
Picco 480 Resins	lb.	0.12
SF-140	lb.	0.21
Piccoflex Resins	lb.	0.16
Pigment 33	ton	40.00
Polyfil 40	ton	40.00
70	ton	53.00
80	ton	65.00
C	ton	25.00
F	ton	45.00
X	ton	30.00
PTiD-70 Poly-Dispersion	lb.	0.60 / 0.75
Purecal M, O	ton	65.00 / 85.00
S, SC, T	ton	117.50 / 137.50
U	ton	127.00 / 147.50
Pyrax A	ton	15.00
W	ton	17.50
Pyrophyllite	ton	24.50
R-97 White Factice	lb.	0.2475
Recco Clay	ton	14.50
SC 25 Clay	ton	14.50
Schenectady SP-6600 Resin	lb.	0.36
-6601 Resin	lb.	0.275
-6700 Resin	lb.	0.35
-6701 Resin	lb.	0.265
Shellflex 310	gal.	0.235
371	gal.	0.24
Silene EF	lb.	0.07
L	lb.	0.0725
Silica	ton	25.00
Snobrite Clay	ton	13.00
Snowflake White	ton	22.00
Sparmite	ton	95.00
Stonelite	ton	11.00
Super Floss	ton	110.00 / 175.00
Suprex Clay	ton	14.50
Swanee Clay	ton	12.50
T-MR Granulated Mineral Rubber	ton	65.00
Type-50 Clay	ton	14.50
Tysonite	lb.	0.3025/ 0.3075
Vanadiset Plastic Resin	lb.	0.031
Veroc White	ton	12.50
Walnut Shell Flour	ton	50.00
#10 White	ton	12.00
#56 White Factice	lb.	0.1925
-S White Factice	lb.	0.165
#57 White Factice	lb.	0.175
#60 White Factice	lb.	0.22
White Vulcanized Vegetable Oils	lb.	0.268
Whitetex	ton	53.00
Wilcarbo Carbon Powders	lb.	$0.15
Windsor Clay	ton	14.50
Wingdale White	ton	$17.00
Wood Flour	ton	45.00
York White	ton	11.50
Zeolex 23	lb.	0.065 / 0.07
Zinc Carbonate	lb.	0.12* / 0.13*
Oxide	lb.	0.115

Non-Black Materials, Latex

ASP-106	ton	57.00
-602	ton	30.00
HPH	ton	33.00
Calwhite-T	ton	27.00
Durez 14798	lb.	0.225
Harwick Clay #12	ton	45.00
#15	ton	21.50
#42	ton	25.00
Lu-Fil	ton	24.00
Marmix 4950	lb.	0.275*
7345	lb.	0.275*
15720	lb.	0.275*
Piccopale Emulsion A-1	lb.	0.108
20	lb.	0.111
22	lb.	0.119
55	lb.	0.112
C-1	lb.	0.113
N-3	lb.	0.122
S-70	lb.	0.175
PR Extender 162	lb.	0.182
Satintone #1	ton	53.00
2	ton	40.00
Special	ton	65.00
#10-T	ton	14.50
UC-55 Clay	ton	27.00
-540 Clay	ton	45.00

Odorants and Anti-Staining Agents

Acetophenone	lb.	1.05
Aktone	lb.	0.2125/ 0.2325
Aldor Deodorant 067	lb.	1.75
272	lb.	3.00
276	lb.	2.25
5781	lb.	1.25
8041N	lb.	2.25
Bouquet 149	lb.	3.00
Cinnamicaldehyde	lb.	0.85
Coumarin	lb.	3.40
Darco S-51	lb.	0.11
Deodorant 64	lb.	2.50
65	lb.	2.25
66	lb.	2.50
Hydrodarco B	lb.	0.07
Irgasan BS 200	lb.	2.50
Methyl Salicylate	lb.	0.6025*
Neutroleum Delta	lb.	2.25
Gamma	lb.	3.25
Rodo #0	lb.	4.50
10	lb.	5.50
Rubber Perfume #5	lb.	8.50
Vanillin	lb.	6.75

Peptizers

Bondogen	lb.	0.605
Hypalon Peptizer H-20	lb.	1.59
P-12	lb.	2.28
W-9	lb.	1.18
Pepton 22 Plasticizer	lb.	0.86
Pitt-Consol 640	lb.	0.42
(Conc.)	lb.	0.70
646	lb.	0.52
(Conc.)	lb.	1.00
Plastone	lb.	0.25
Polyac Pellets	lb.	1.85
RPA #2	lb.	0.85
3	lb.	0.51
(Conc.)	lb.	0.85
6	lb.	1.66

Plasticizers and Softeners

AA-1144 Sunproofing Compound	lb.	0.17
-1177 Sunproofing Compound	lb.	0.145
Castor Oil	lb.	0.23
Acintol D Distilled Tall Oil	lb.	0.0525/ 0.075
DLR Special Distilled Tall Oil, Low Resin	lb.	0.0525/ 0.075
P Tall Oil Pitch	lb.	0.0125/ 0.0275
Alitrile 11	lb.	0.38
Allied G-1	lb.	0.07
Amine O	lb.	0.47
Barium Stearate	lb.	0.41 / 0.46
Bearflex LPO	lb.	0.03
MPO	lb.	0.0375
Bunarex Resins	lb.	0.085
Bunatak #90	lb.	0.09
210	lb.	0.14
AH	lb.	0.095
N	lb.	0.31
U	lb.	0.175
Bunaweld Polymer #780	lb.	0.24
Butyl Oleate	lb.	0.23 / 0.27
Stearate	lb.	0.2375/ 0.2775
Calcium Stearate	lb.	0.39* / 0.44*
Califlux 510	lb.	0.0275
550	lb.	0.0275
GP	lb.	0.015
LBL	lb.	0.17
OSR	lb.	0.01875
R-100	lb.	0.0475
RC	lb.	0.135
TT	lb.	0.0195

MACHINERY AND SUPPLIES FOR SALE (CON'T.)

FIRST-RATE EQUIPMENT FROM YOUR FIRST SOURCE 4-ROLL Inverted-L Calender, 12″ x 24″; 3-Roll Calenders, 6″ x 18″ and 22″ x 60″; Farrel Birmingham Mills, 16″ x 40″, 22″ x 60″; F-B Banbury Mixers No. 00, No. 3, No. 11; Hydraulic Press, 22″ Ram, 36″ x 36″ Platens; Hydraulic Press, 23″ Ram, (3) 30″ x 48″ Platens; (6) Hydraulic Presses, 14″ Ram, 36″ x 36″ Platens; (21) Hydraulic Presses, 14″ Ram, (5) 32″ x 24″ Platens; Vulcanizers, 24″ x 48″, 40″ x 54″, 6′ x 18″; Taylor Stiles Precision Cutter #224; B. & J., Abbe, Cumberland Rotary Cutters, Pelletizers; Hartig 4½″ and 6″ Electric Extruders; NRM 1½″ Jacketed Extruder, 3-HP. Vari-Speed; Ball Mills, Blenders, Double-Arm Mixers, Dryers. FIRST MACHINERY CORP., 209-289 Tenth St., Brooklyn 15, N. Y. STerling 8-4672. Cable: Effemcy.

2200-TON BIRDSBORO HEAVY-DUTY RUBBER MAT PRESSES. Bed size 7′ x 5′. Each press contains two 25″-diameter rams. Complete with Intensifiers for 4000 PSI. 6″ Extruder Line Consisting of: Royle #4 Extruder, Wire take-ups, wire capstans, water troughs, and other accessory equipment. Farrel Birmingham Roll Grinder, 36″ x 240″, 20-HP. motor. Two 20″-diameter grinding wheels with 7½-HP. motor. Can be inspected under power. BELT PRESS—1500 Ton R. D. Wood, three 18″-diameter upmoving rams x 36″ stroke. Bed size 50″ x 240″. 1″ NRM Steamheated Laboratory Extruder. Like New! With variable-speed pulley drive. 3½″ National Erie Extruder, steam-heated. 3¼″ Royle #2 Rubber Extruder. Span Grinder, complete with 25-HP. motor. Rubber Bale Cutter, Peerless Knife Type, also Hydraulic Guillotine Type. 24″ x 24″ Bale. Aetna 5′ x 10′ Steam Vulcanizer. With quick-opening-type door. Clean job. We carry a complete line of mixers, vulcanizers, calenders, churns, bale cutters and other allied equipment for the rubber industry. WE WILL FINANCE. What do you need? What do you have for sale? JOHNSON MACHINERY COMPANY, 90 Elizabeth Ave., Elizabeth, New Jersey. EL 5-2300. WE SPECIALIZE IN PLANT LIQUIDATIONS AND PURCHASES.

FOR SALE: BAKER-PERKINS #16-UUEM, 150-GALLON DISPERsion jacketed mixer, 150-HP. XP motor, Vaulted Cover; Baker-Perkins 100-gallon T347 Stainless jacketed dispersion blade mixer. Baker-Perkins #15-UUMM dispersion blade double-arm mixer, 100 gallon, jacketed, 100 HP. explosionproof motor, motorized tilt, cored blades, compression ram cover. Also 200-gallon B-P mixers. PERRY EQUIPMENT CORPORATION, 1424 North 6th Street, Philadelphia 22, Pa.

— FOR SALE —

4—Blaw Knox 6′ x 40′ horizontal vulcanizers with quick-opening doors, 250# working pressure, ASME.
2—Royle #½ extruders, complete.
1—Peerless, guillotine cutter, 30″ blade, with motor.
1—Allen 4″ extruder with 25-HP. motor.
Address Box No. 2654, care of RUBBER WORLD.

FOR SALE: LABORATORY MILLS—NEW AND USED, 6 x 12″, 6 x 13″, 6 x 16″, 8 x 18″, 10 x 24″, complete with oil seals, drive, brake motor, and starter. RUBBER & PLASTIC MACHINERY OF NEW JERSEY, P.O. Box 1543, Trenton, New Jersey.

FOR SALE REBUILT: PATTERSON HEAVY-DUTY RUBBER churn, jacketed, total capacity 275 gallons, working capacity approximately 200 gallons, with Master 20-HP. explosionproof motor and Patterson Unipower drive. IRVING BARCAN COMPANY, 249-51 Orient Avenue, Jersey City 5, New Jersey.

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FOR SALE: 1—THROPP 18″ x 50″ 2-ROLL MILL 125 H.P.; 1—Thropp 6″ x 12″ 2-Roll Mill 7½ H.P.; 1—No. 18 Cumberland Rotary Cutters; 3—Baker-Perkins Sigma-blade jacketed Mixers, 150, 100, and 50 gal.; 3—Mikro Pulverizers, Bantam, 1SH and 1SI; 6—Stokes Preform Presses, models R, T, DD2, DDS2, DS2 and D4; partial listing, send for details. BRILL EQUIPMENT CO., 35-49 Jabez St., Newark 5, N. J. Tel.: MArket 3-7420.

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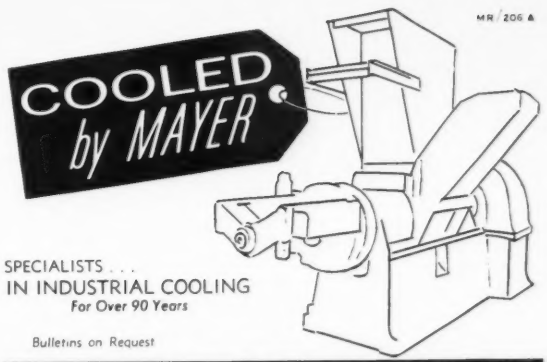

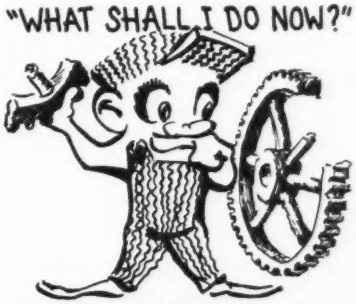

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Catalin Resin 8318	lb.	$0.3425
Citroflex 2	lb.	0.4375
4	lb.	0.40
A-2	lb.	0.37
-4	lb.	0.33
Contogums	lb.	0.1275
Cyclolube 4053	gal.	0.21
OSR	gal.	0.28
Dextro-Limonene	lb.	0.12
Dibenzyl Sebacate	lb.	0.91 / $0.94
Dibutyl Phthalate	lb.	0.28 / 0.32
Sebacate	lb.	0.655 / 0.685
Dicapryl Phthalate	lb.	0.265 / 0.305
Di-"Carbitol" Phthalate	lb.	0.485 / 0.51
Diethyl Phthalate	lb.	0.2575/ 0.2975
Di-(2-Ethylhexyl) Azelate	lb.	0.41 / 0.45
Phthalate	lb.	0.235 / 0.275
Diglycol Laurate	lb.	0.57
Oleate	lb.	0.57
Stearate	lb.	0.37
Diisobutyl Phthalate	lb.	0.265 / 0.305
Dimethyl Phthalate	lb.	0.2575/ 0.2975
Dioctyl Adipate	lb.	0.36 / 0.40
Phthalate	lb.	0.235 / 0.275
Sebacate	lb.	0.5775/ 0.6175
Durez 11504	lb.	0.345
12686	lb.	0.365
12687	lb.	0.375
12707	lb.	0.375
13037	lb.	0.35
13349	lb.	0.28
13355	lb.	0.29
Dutrex 419	lb.	0.032
726	gal.	0.13
739	lb.	0.0275
757	gal.	0.13
786	gal.	0.14
787	gal.	0.13
896	gal.	0.13
Emery 906 Tall Oil Pitch	lb.	0.0125/ 0.0375
Endor	lb.	0.67
Estynox 408	lb.	0.3775
Flexricin 13	lb.	0.4225
P-1	lb.	0.365
-4	lb.	0.3325
-6	lb.	0.40
-8	lb.	0.3325
Fura-Tone NC-1008	lb.	0.30
Galex W-100	lb.	0.2075/ 0.245
D	lb.	0.2025/ 0.24
Glycerin	lb.	0.2475/ 0.2725
Glycerol Mono-Oleate	lb.	0.57
Monoricinoleate	lb.	0.68
Monostearate	lb.	0.35
Hallco 3880	lb.	0.485 / 0.53
C-311	lb.	0.34 / 0.38
-325	lb.	0.34 / 0.38
-392	lb.	0.65 / 0.685
-428	lb.	0.455 / 0.505
-494	lb.	0.5925/ 0.6225
-496	lb.	0.5925/ 0.6225
-497	lb.	0.40 / 0.435
-498	lb.	0.455 / 0.505
-503	lb.	0.23 / 0.26
-566	lb.	0.11 / 0.13
-642	lb.	0.65 / 0.685
HA-5-A	lb.	0.805 / 0.81
-7-A	lb.	0.55 / 0.555
-57-A	lb.	0.76 / 0.765
Harflex 300	lb.	0.58 / 0.615
325	lb.	0.4325/ 0.46
330	lb.	0.4425/ 0.4725
375	lb.	0.7425/ 0.77
Heavy Oil #1-D	lb.	0.065
Indonex W-2	lb.	0.13
Indopol H-100	gal.	0.85
-300	gal.	1.00
L-10	gal.	0.45
Kenflex A	lb.	0.26 / 0.33
L	lb.	0.28 / 0.35
Kenplast	lb.	0.20 / 0.24
KP-140	lb.	0.46 / 0.485
Kronisol	lb.	0.355 / 0.39
Kronitex 1, AA, K-3, MX	lb.	0.325 / 0.36
Lauric Acids	lb.	0.45
Lead Stearate #30	lb.	0.36 / 0.41
50	lb.	0.55 / 0.60
P-30	lb.	0.55 / 0.60
London Rosin Oil	lb.	0.16 / 0.18
Magnesium Stearate	lb.	0.41 / 0.46
Methox	lb.	0.395 / 0.43
Millrex	lb.	0.15
Morflex 210	lb.	0.5925
240	lb.	0.655
250	lb.	0.91
300	lb.	0.40
310	lb.	0.40
325	lb.	0.40
330	lb.	0.40
350	lb.	0.70
375	lb.	0.40
410	lb.	0.455
Nevillac TS	lb.	0.85
Neville LX 685, 125	lb.	0.12 / 0.125
782	lb.	0.075 / 0.08
Resin R-12	lb.	0.16 / 0.165
-16	lb.	0.16 / 0.165
-A	lb.	0.15 / 0.155
-17	lb.	0.145 / 0.15
-29	lb.	0.15 / 0.155
Nevinol	lb.	0.24
Nilox	lb.	0.1715
Nuroz	lb.	0.1475
Ohopex-R-9	lb.	0.3525/ 0.3775
Oleic Acids	lb.	0.14 / 0.1975
P-10 Ricinoleic Acid	lb.	0.3475
Panarez 3-210	lb.	0.125*
6-210	lb.	0.12*
7-210	lb.	0.10*
Panarez 12-210	lb.	$0.115*
Para-Flux 2016	gal.	$0.175 / 0.28
4156	gal.	0.255 / 0.275
Para Lube	lb.	0.46 / 0.48
Resin 6600	lb.	0.035 / 0.055
C-230	lb.	0.15 / 0.22
Paracin 8	lb.	0.415
Paradene #1	lb.	0.09 / 0.095
2	lb.	0.095 / 0.10
33	lb.	0.0875/ 0.0925
35	lb.	0.0875/ 0.0925
Penbro	lb.	0.075
Pepton 65 Plasticizer	lb.	0.086
Petroflux MV	gal.	0.097
Picco Aromatic Plasticizers	lb.	0.085
Resins	lb.	0.085 / 0.19
Piccocizer 30		0.055
40		0.085
R	lb.	0.05
Piccolastic A Series	lb.	0.0775
C Series	lb.	0.091
D Series	lb.	0.26
E Series	lb.	0.26 / 0.265
Piccolyte Resins	lb.	0.2225/ 0.2425
Piccopale Resins	lb.	0.0775
Pitch, Atlas Burgundy	lb.	0.23 / 0.25
Hardwood	lb.	0.07
Stearin	lb.	0.06
Plasticizer LP	lb.	0.075
MP	lb.	0.085
MT-511	lb.	0.6925
OLN	lb.	0.38
SC	lb.	0.39
Plastogen	lb.	0.09
Plastolein 9404 TGP	lb.	0.38 / 0.43
Polycin	lb.	0.30
Polymel C-2 Resin	lb.	0.165
-D Powder	lb.	0.185 / 0.195
-DX Resin	lb.	0.1375/ 0.1475
-111 Powder	lb.	0.1425
"Plasticil" Resin	lb.	0.105 / 0.1075
"Plasticil-NS" Resin	lb.	0.115 / 0.1175
Polymeric Plasticizer NP-10	lb.	0.44 / 0.48
Prenol A	lb.	0.38 / 0.40
PT 101 Pine Tar Oil	lb.	0.044
400 Light Pine Tar	lb.	0.044
600 Medium Pine Tar	lb.	0.044
800 Heavy Pine Tar	lb.	0.044
Reogen	lb.	0.145
Resin 82	lb.	0.185 / 0.205
84	lb.	0.20 / 0.22
Resinex L-4 & L-5	lb.	0.0375
Resins	lb.	0.0375
Ricinoleic Acid	lb.	0.3275
Rosin, Wood	lb.	0.1065
Santicizer 140	lb.	0.325 / 0.36
B-16	lb.	0.455 / 0.485
E-15	lb.	0.52 / 0.55
M-17	lb.	0.43 / 0.46
Shellflex	gal.	0.205
212	gal.	0.175
292	gal.	0.195
412	gal.	0.21
732	gal.	0.2225
Solros	lb.	0.126
Tallene	ton	25.00 / 60.00
Tarene 20, 40	lb.	0.029
Thiokol LP-3	lb.	0.96
TP-90B	lb.	0.59
-95	lb.	0.65
Triacetin	lb.	0.355 / 0.395
Tributyl Aconitate	lb.	0.60
Phosphate	lb.	0.50 / 0.535
Tricresyl Phosphate	lb.	0.325 / 0.36
Turpol N C-1200	lb.	0.61
Zinc Laurate	lb.	0.55

Plasticizers and Softeners, Latex

Arlex	lb.	0.26
Durez 14136	lb.	0.325
G-2401	lb.	0.2325
Latex Plasticizer A-12	lb.	0.096
OPD #101	lb.	0.29
104	lb.	0.245
Sorbitol Special	lb.	0.2125

Preservatives, Latex

Ammonia	ton	95.00
Eastman Inhibitor HPT	lb.	6.00
Formaldehyde	lb.	0.0405*

Processing Aids and Dispersing Agents

Alrowet D-65	lb.	0.32
Bakelite Polyethylene Resins		
DGD-4100	lb.	0.38
DYNH	lb.	0.275
Butaprene SL	lb.	0.36
Calcium Stearate	lb.	0.39 / 0.44
Castorwax (Opalwax)	lb.	0.3075
Cyclolube 114	gal.	0.19
NN-1	gal.	0.125
-2	gal.	0.125
-3	gal.	0.125
-4	gal.	0.135
Kenflex N	lb.	0.19 / 0.26
Lycocol O	lb.	0.70
Marbon 8000	lb.	0.36*
8000A	lb.	0.36*
8000AE	lb.	0.36*
8000E	lb.	0.36*
Millex	lb.	0.07 / 0.10
Neville LX 685, 135	lb.	0.12 / 0.125
685, 180	lb.	0.125 / 0.13
Parco Resin #200-S-1	lb.	$0.23
Piccotex Resins	lb.	$0.25*
Rubberol Compound	lb.	0.2575
TI-Sperse	lb.	0.21

Processing Aids, Latex

Indusoil L-5	lb.	0.05 / 0.0775
Ludox HS Colloidal Silica	lb.	0.1625

Reclaiming Materials

Actinol P Tall Oil Pitch	lb.	0.125 / 0.275
Emery 906 Tall Oil Pitch	lb.	0.0125/ 0.0375
Neville LX 777	gal.	0.23 / 0.33
809	gal.	0.23 / 0.33
Picco C-42 Reclaiming Agent	gal.	0.23
D-4 Reclaiming Agent	gal.	0.42
D-12 Reclaiming Agent	gal.	0.30
Pitt-Consol 500	lb.	0.23 / 0.255
(Concentrated)	lb.	0.30 / 0.325
500 NS	lb.	0.31 / 0.335
(Concentrated)	lb.	0.38 / 0.405
Polymel RC-57	lb.	0.30
RR-10	lb.	0.37
Sodium Hydroxide—Flake	lb.	0.052
Solid	lb.	0.048
Tallene	ton	25.00 / 60.00

Release Agents

Acintol FA1/Special Tall Oil Fatty Acid	lb.	0.05 / 0.0725
Tall Oil Fatty Acid	lb.	0.05 / 0.0725
FA2 Tall Oil Fatty Acid	lb.	0.06 / 0.0825
Akro-Gel	lb.	0.135
Aluminum Stearates	lb.	0.39 / 0.44
Amber (Flakes)	lb.	0.115
Aquadag	lb.	3.50
Aquarex D	lb.	0.81
L	lb.	0.94
MDL	lb.	0.33
ME	lb.	0.82
WAQ	lb.	0.21
Colite Concentrate	gal.	0.90
Dow Corning 7 Emulsion	lb.	1.59
20 Compound	lb.	1.74
35A Emulsion	lb.	1.09
35B Emulsion	lb.	1.09
36 Emulsion	lb.	1.09
37 Emulsion	lb.	1.09
Dri-Lube	lb.	0.22
ELA	lb.	0.82
Epolene E-10	lb.	0.35 / 0.42
-11	lb.	0.35 / 0.42
-12	lb.	0.35 / 0.42
N-10	lb.	0.275 / 0.345
-11	lb.	0.275 / 0.345
Hallco Inner-Lube	lb.	0.25
Hawkeye Soap	lb.	0.14
Ivory	lb.	0.15
Lubri-Flo	gal.	10.00
Lupar	gal.	1.90
Mold Wiz 1-C	lb.	1.00
#249	gal.	6.00
#U-5-6	gal.	6.00
Olate	lb.	0.18
Orvus AB	lb.	0.115
ES	lb.	0.114
WA	lb.	0.1825
Peerless Rubber Lube No. #744	gal.	0.75
751	lb.	0.17
Prodag	lb.	0.32
Purity Soap	lb.	0.1725
Silrex S-1	lb.	0.65
Solricin 135	lb.	0.12
Union Carbide L-45 Silicone Oil	lb.	2.74
-522 Organo-Silicone Oil Emulsion	lb.	2.58
LE-45 Silicone Oil Emulsion	lb.	1.09
-46 Silicone Oil Emulsion	lb.	1.09
-450 Silicone Oil Emulsion	lb.	1.09
WS-95 Silicone Gum Solution	lb.	0.60
-951 Silicone Gum Solution	lb.	0.60

Retarders

E-S-E-N	lb.	0.41
Maleic Acid	lb.	0.2875
Anhydride	lb.	0.225
Malic Acid	lb.	0.55
Nadic Anhydride	lb.	1.24
Retarder BA	lb.	0.29
J	lb.	0.70
PD	lb.	0.41
W	lb.	0.47
Retardex	lb.	0.47 / 0.50
Turgum S	lb.	0.141 / 0.151
Wiltrol P	lb.	0.38 / 0.41

Solvents

Acetone	lb.	0.07 / 0.11
Amoco Toluene	gal.	0.255*
Xylene	gal.	0.285
Amyl Acetate	lb.	0.155

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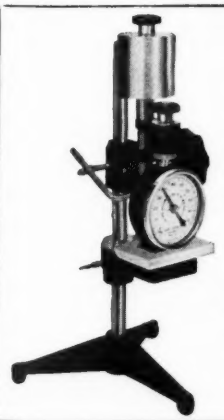

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Bronoco Lacolene	gal.	$0.205*	
Normal Hexane	gal.	0.233*	
Rubber Solvent	gal.	0.17*	
Butyl Acetate, Normal	lb.	0.145 /	$0.185
Secondary	lb.	0.1225/	0.1625
Alcohol, Normal	lb.	0.155 /	0.195
Secondary	lb.	0.125 /	0.165
Carbon Bisulfide	lb.	0.071 /	0.086
Tetrachloride	lb.	0.1075	
Cyclohexane	gal.	0.36	
Dichloroethyl Ether	lb.	0.155	
Ethyl Acetate	lb.	0.125 /	0.165
Alcohol	gal.	0.52	
Ethylene Dichloride	lb.	0.09	
Hexane	lb.	0.1584/	0.385
Isobutyl Acetate	lb.	0.1275/	0.1675
Alcohol	lb.	0.13 /	0.17
Isopropyl Acetate	lb.	0.115 /	0.155
Alcohol	gal.	0.46	
Methyl Ethyl Ketone	lb.	0.125 /	0.165
Methylene Chloride	lb.		0.11
Monochlorbenzene	lb.	0.0875	
Nadone Cyclohexanone	lb.	0.31	
Naphtha, Solvent	gal.	0.295 /	0.385
Neville Blend #27	gal.	0.35 /	0.42
Petroleum Ether	gal.	0.185 /	0.49
Tecsol	gal.	0.56 /	0.77
Toluol	gal.	0.255	
Trichlorethylene	lb.	0.1126	

Stabilizers, Latex

Alubragum 825	lb.	0.10* /	0.11*
Aquarex MDL	lb.		0.33
ME	lb.		0.82
NS	lb.		0.60
WAQ	lb.		0.21
BRIJ 35	lb.	0.48	
Diglycol Laurate	lb.		0.57
Oleate	lb.		0.57
Dimethylamine	lb.	0.28	
Emersol 233 LL Oleic Acid	lb.	0.145 /	0.195
Nonisol 100	lb.	0.39	
Nonox WSL	lb.		1.47
WSP	lb.		1.50
S-1	lb.		0.815
Sequestrene AA	lb.	0.70	
ST	lb.	0.43	
Stablex A	lb.		0.80
B	lb.		0.50
G	lb.		0.50
TI-Sperse	lb.	0.21 /	0.21
Ultrawet DS or KX	lb.	0.26	
Volclay	ton		14.00

Tackifiers

Acintol R Tall Oil Rosin	lb.	0.1375/	0.1425
Bakelite BKR-2620	lb.	0.385	
CKR-0036	lb.	0.49	
-1634	lb.	0.38	
CRL-3060	lb.	0.445	
Butac	lb.	0.1585/	0.1685
Durez 12603	lb.	0.29	
Indopol H-100	gal.	0.85	
-300	gal.	1.00	
L-10	gal.	0.45	
Natac	lb.	0.1535/	0.1635
Nevillac 10°	lb.	0.39 /	0.39
910 Cmpd	lb.	0.70 /	0.70
Hard	lb.	0.31 /	0.31
Soft	lb.	0.32 /	0.32
TS	lb.	0.85 /	0.85
Nevidene LX-509	lb.	0.245 /	0.25
R-1	lb.	0.195 /	0.20
-3	lb.	0.185 /	0.19
-5	lb.	0.175 /	0.18
-6	lb.	0.165 /	0.17
Schenectady SP-12 Resin	lb.	0.4075	
-102 Resin	lb.	0.3975	
-103 Resin	lb.	0.4075	
-126 Resin	lb.	0.38	
-553 Resin	lb.	0.3075	
-560 Resin	lb.	0.29	
-1047 Resin	lb.	0.3425	
-8014 Resin	lb.	0.355	
ST-5000 Series	lb.	0.2225	
Synthol	lb.		0.2875
Tarpine	lb.	0.035	
Turgum SB	lb.	0.095 /	0.105
Velsicol GD 5-28	lb.	0.075	
GE-9 Resin	lb.	0.06	
M-144 Oil	lb.	0.025	
X-30 Resin	lb.	0.12	
Zinar	lb.	0.1926	
Zirex	lb.	0.1875	
Zitro	lb.	0.1825	

Tackifiers, Latex

Piccopale Emulsion A-43	lb.		0.0995
Resin Emulsion J-769-A	lb.		0.182

Thickeners, Latex

Alcogum AN-6	lb.		0.06
-10	lb.		0.09
-25	lb.		0.31
PA-15-A	lb.		0.135
-B	lb.		0.135
Casein PMX	lb.		0.32
Darex 632L	lb.	0.275	
Hycryl A-1000	lb.	0.09	
-2000	lb.	0.335	
Jorco 606	lb.		0.12
A-1002	lb.	0.12	
Paragum #12	lb.		$0.12
A-25	lb.		0.12
Protovac PV-430	lb.		0.35
Thickener #17	lb.		0.09
TI-Gum	lb.		0.105

Wetting Agents, Latex

Beaconol M	lb.		0.42
S	lb.		0.40
T	lb.		0.67
Ethyl Lactate	lb.	$0.54	
Nacconol NR	lb.		0.13
NRSF	lb.		0.405
SL	lb.		0.095
Renex 600 Series	lb.	0.235	
Sandozin D-100	lb.		0.29
Tween 20	lb.	0.425	

Vulcanizing Agents

Black Bird Brand Sulfur	lb.	0.029 /	0.0765
Catalin Resin 9273	lb.	0.3825	
DADI	lb.		3.00
DCI Light Magnesium Oxide	lb.	0.235	
Magnesium Oxide #601 Grade	lb.	0.2525	
E-3 Grade	lb.	0.215	
Dibenzo G-M-F	lb.		2.60
Dichlorobenzidine, Urethane Grade	lb.		1.45
G-M-F	lb.		2.60
Ko-Blend I.S.	lb.	0.39 /	0.39
Linde Chemical-Loaded Molecular Sieve CW-2015	lb.		3.00
Maglite D, K	lb.	0.205 /	0.235
M	lb.	0.27 /	0.285
V	lb.	0.235 /	0.25
Magnesia, Calcined	lb.	0.23	
Michigan #15 Heavy Calcined Magnesia	lb.	0.055	
#30 Light Calcined Magnesia	lb.	0.2525	
1782 Magnesia	lb.	0.2525	
Mist Brand Sulfur	lb.	0.0405/	0.093
PAPI	lb.		1.50
Poly-Dispersion PRDSD-7875	lb.	1.36 /	1.51
PSD-75	lb.	0.37 /	0.44
PWD-70, PWID-70	lb.	2.65 /	2.80
Schenectady SP-1055 Resin	lb.	0.45	
Seamag	lb.		6.50
Spider Brand Sulfur	lb.	0.0285/	0.076
Sulfur, MC	lb.	0.0275	
Rubbermakers	lb.	0.0245	
Telloy	lb.		5.00
Thiokol VA-7	lb.		0.75
TODI	lb.		2.50
Vandex	lb.		6.50
Vultac 2	lb.	0.47 /	0.49
3	lb.	0.51 /	0.53

Vulcanizing Agents, Latex

Mist Brand Sulfur	lb.	0.0405/	0.093
Sulfur, Dispersed	lb.		0.12
Dispersion #3	lb.	0.097	

Synthetic Rubber

(*Continued from page 114*)

Synpol 8253		$0.1584[b] /	$0.1644[b]
8254		0.1545[b] /	0.1605[b]
8255		0.148[b] /	0.154[b]
8267		0.164[b] /	0.17[b]

Cold SBR Rosin Masterbatch

Copo 3900		0.231[c] /	0.237[c]

Cold SBR Latex

CL-101			0.28[a]
Copo 2101			0.30[c]
2102, 2105, 2110			0.32[c]
2108			0.30[c]
2109			0.2775[c]
3852			0.30[c]
FR S 2105		0.32[c] /	0.366[c]
Naugatex 2105, 2107		0.32[a] /	0.38[a]
2108		0.30[a] /	0.38[a]
2113		0.29[a] /	0.36[a]
Pliolite Latex 2101			0.30[c]
2105, 2107			0.32[c]
2108			0.30[c]
5350, 5332			0.32[c]
5353			0.30[c]
Polysar Latex 721			0.32[c]
722, 723			0.32[c]
741			0.30[c]
781			0.675[c]
S-2101			0.26[a]
-2105			0.28[a]
-2107			0.32[a]
-2108			0.29[a]
Tylac 1705			0.32[a]
1757			0.30[a]

Misc. SBR

Dow Latex 512K, 512R, 513K, 529HS, 529K, 630, 762K, 762W			0.275[b]
512L, 560, 737K			0.295[b]
546C			0.265[b]
566			0.365[b]
762L			0.315[b]
FR-S 110 (latex)		0.3000[c]	
-150 (latex)		0.3000[c]	
-174 (latex)		0.2950[c]	
-176 (latex)		0.2775[c]	
-182		0.241[c] /	0.247[c]
-184		0.1885[c]/	0.1945[c]
Kralac A-EP		0.30[b] /	0.32[b]
Naugapol K-50		0.27[b] /	0.28[b]
K-65		0.28[b] /	0.29[b]
Shell SP-102, -103		0.26[a]	

Urethane Types

Adiprene L, LD-167, -213	lb.	1.15 /	1.65
Cyanaprene 4590	lb.		1.30[a]

O'Sullivan Rubber Corp., Winchester, Va., has been awarded the Employers Merit Certificate by President Kennedy's Committee on Employment of the Physically Handicapped. Pictured left to right are: John Hawse, local manager, State Vocational Rehabilitation Service; Wilson Dickson, chairman of the local EPH committee; Robert Glass, personnel director of O'Sullivan; Paul Terretta, president

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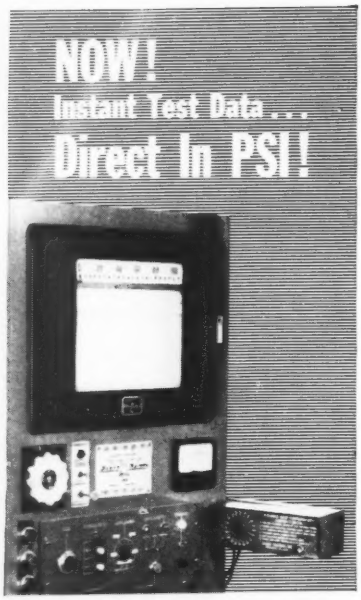

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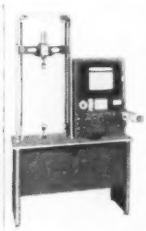

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CALENDAR of COMING EVENTS

November 17
Connecticut Rubber Group.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

November 17-18
Southern Rubber Group. Memphis, Tenn.

November 21
Elastomer & Plastics Group, Northeastern Section, ACS. Motel 128, Dedham, Mass.

November 29-December 1
Tenth Annual Wire and Cable Symposium. Berkeley-Carteret Hotel, Asbury Park, N. J.

December 7
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

December 8
Detroit Rubber & Plastics Group, Inc.
The Los Angeles Rubber Group, Inc. Christmas Party. Beverly Hilton Hotel.

December 9
Southern Ohio Rubber Group.

December 12
Buffalo Rubber Group. Christmas Party. Buffalo Trap & Field Club.

December 15
New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
Boston Rubber Group. Christmas Party. Hotel Somerset, Boston, Mass.
Chicago Rubber Group. Christmas Party. Morrison Hotel, Chicago, Ill.

1962

January 16
Elastomer & Plastics Group, Northeastern Section, ACS.

January 18
Quebec Rubber & Plastics Group. Panel Discussion on Polyurethanes.

January 26
Akron Rubber Group.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

January 26-27
Southern Rubber Group.

February 5-9
American Society for Testing Materials. Committee Week. Statler Hilton Hotel, Dallas, Tex.

February 6
The Los Angeles Rubber Group, Inc.

February 8
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

February 20
Elastomer & Plastics Group, Northeastern Section, ACS.

February 23
Quebec Rubber & Plastics Group. Ladies Night.
Akron Rubber Group. Dance. Sheraton Hotel, Akron, O.

March 2-4
Boston Rubber Group. Ski Week-End. Bartlett Hotel, Bartlett, N. H.

March 6
The Los Angeles Rubber Group, Inc.

March 16
Boston Rubber Group. Somerset Hotel, Boston, Mass.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

March 20
Elastomer & Plastics Group, Northeastern Section, ACS.

March 20-29
American Chemical Society. Washington, D. C.

March 22
Quebec Rubber & Plastics Group. Technical Meeting—Aging of Rubber.

March 23
New York Rubber Group. Henry Hudson Hotel, New York, N. Y.

March 24-27
National Association of Secondary Material Industries. Forty-Ninth Annual Convention. Edgewater Beach Hotel, Chicago, Ill.

April 3
The Los Angeles Rubber Group, Inc.

April 5
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Akron Rubber Group. Sheraton Hotel, Akron, O.

April 6
Akron Rubber Group.

April 17
Elastomer & Plastics Group, Northeastern Section, ACS.

April 19
Quebec Rubber & Plastics Group. Technical Meeting—Butyl Tires.

April 24-27
Division of Rubber Chemistry, ACS. Statler Hotel, Boston, Mass.

May 4
Rubber Chemistry Division, Chemical Institute of Canada. Niagara Falls, Ont., Canada.
Chicago Rubber Group. Furniture Club, Chicago, Ill.

May 14-18
International Rubber Conference. Paris, France.

May 19-29
Europlastique 1962. Paris, France.

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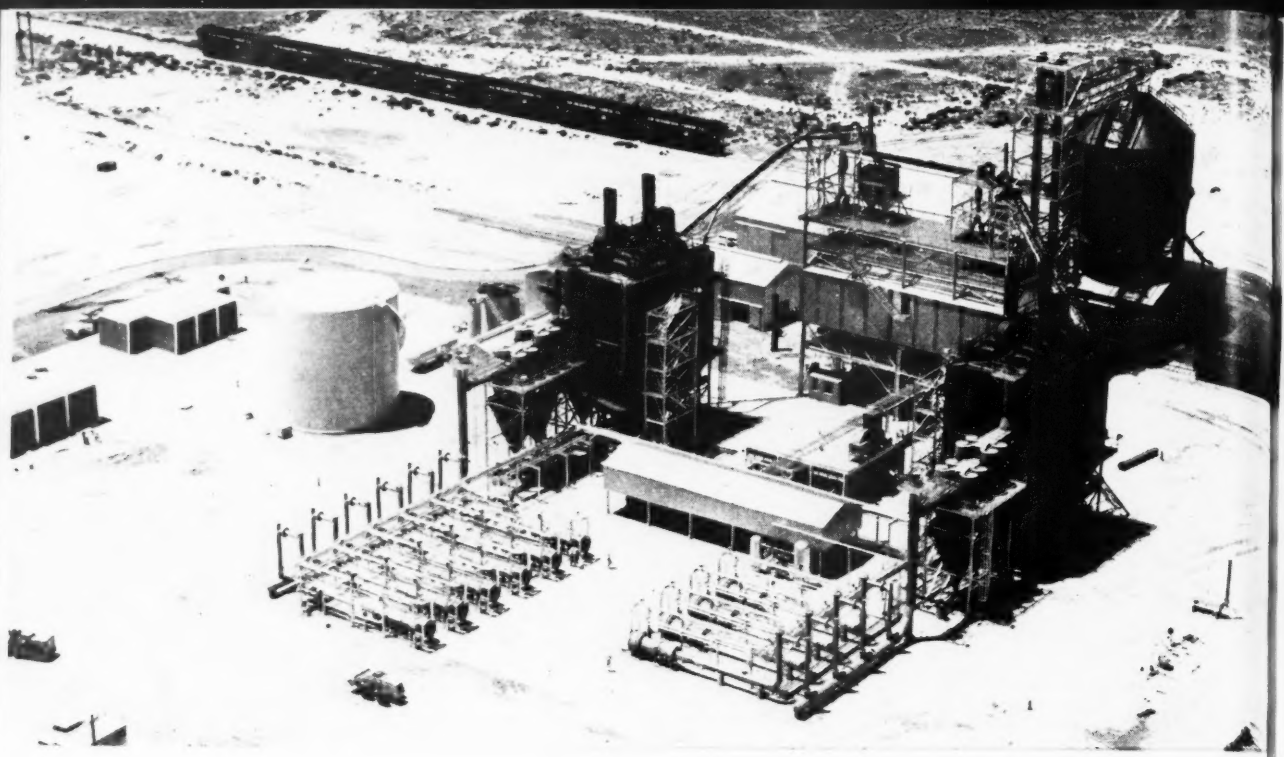

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